



Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011(274)
August 1985



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NEW FOREIGN TECHNOLOGY INDEX INCLUDED IN THIS ISSUE

Aerospace Medicine and Biology:
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(Supplement 274)
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Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series)

N85-22342 – N85-25167

IAA (A-10000 Series)

A85-30223 – A85-33354

SPECIAL NOTICE

FOREIGN TECHNOLOGY INDEX IN THIS ISSUE

Documents referred to in this bibliography whose country of intellectual origin is other than the United States are listed in the Foreign Technology Index (see page D-1).

A great deal of excellent scientific and technical work is done throughout the world. To the extent that U.S. researchers, engineers, and industry can utilize what is done in foreign countries, we save our resources. We can thus increase our country's productivity.

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Foreign Technology Index:

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- ☐ Is useful, but other sources can be used.
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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 274)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in July 1985 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*



Scientific and Technical Information Branch

National Aeronautics and Space Administration

Washington, DC

1985

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, Aerospace Medicine and Biology (Volumes I - XI) should be directed to NTIS.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 128 reports, articles and other documents announced during July 1985 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Seven indexes -- subject, personal author, corporate source, foreign technology, contract, report number, and accession number -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1985 Supplements.

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TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT				AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER	N85-11521*	Research Triangle Inst., Research Triangle Park, N.C.	CORPORATE SOURCE	
TITLE	APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Final Report			
AUTHORS	B. BASS, H. C. BEALL, J. N. BROWN, JR., W. H. CLINGMAN, R. E. EAKES, P. N. KIZAKEVICH, M. MCCARTNEY, and D. J. ROUSE			PUBLICATION DATE
REPORT NUMBER	(Contract NAS1-16177) (NASA-CR-165872; NAS 1.26:165872)			COSATI CODE
AVAILABILITY SOURCE	Avail: NTIS HC A07/MF A01 CSCL 06B			

Utilization of National Aeronautics and Space Administration (NASA) technology in medicine is discussed. The objective is best obtained by stimulation of the introduction of new or improved commercially available medical products incorporating aerospace technology. A bipolar donor/recipient model of medical technology transfer is presented to provide a basis for the team's methodology. That methodology is designed to: (1) identify medical problems and NASA technology that, in combination, constitute opportunities for successful medical products; (2) obtain the early participation of industry in the transfer process; and (3) obtain acceptance by the medical community of new medical products based on NASA technology. Two commercial transfers were completed: the Stowaway, a lightweight wheelchair that provides mobility for the disabled and elderly in the cabin of commercial aircraft, and Micromed, a portable medication infusion pump for the reliable, continuous infusion of medications such as heparin or insulin. The marketing and manufacturing factors critical to the commercialization of the lightweight walker incorporating composite materials were studied. Progress was made in the development and commercialization of each of the 18 currently active projects.

E.A.K.

TYPICAL CITATION AND ABSTRACT FROM /AA

NASA SPONSORED DOCUMENT				TITLE
AIAA ACCESSION NUMBER	A85-18152*	Albert Einstein Coll. of Medicine, New York.	MECHANISM OF COLOUR DISCRIMINATION BY A BACTERIAL SENSORY RHODOPSIN	
AUTHORS	J. L. SPUDICH (Albert Einstein College of Medicine, Bronx, NY) and R. A. BOGOMOLNI (California, University, San Francisco, CA)			AUTHOR'S AFFILIATION
TITLE OF PERIODICAL	Nature (ISSN 0028-0836), vol. 312, Dec. 6, 1984, p. 509-513. refs			PUBLICATION DATE

(Contract NIH-GM-27750; NIH-GM-27057; NSG-7151; NSF PCM-83-16139)

A photosensitive protein resembling the visual pigments of invertebrates enables phototactic archaebacteria to distinguish color. This protein exists in two spectrally-distinct forms, one of which is a transient photoproduct of the other and each of which undergoes photochemical reactions controlling the cell's swimming behaviour. Activation of a single pigment molecule in the cell is sufficient to signal the flagellar motor. This signal-transduction mechanism makes evident a color-sensing capability inherent in the retinal/protein chromophore.

Author

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 274)

AUGUST 1985

51

LIFE SCIENCES (GENERAL)

Includes genetics.

A85-30650

ERYTHROPOIETIN PRODUCTION IN HYPOXIC RATS AFTER INDOMETHACIN APPLICATION

N. D. NACHEV (Meditsinska Akademiia, Sofia, Bulgaria) and A. P. LOGOFETOV (Bolgarskaia Akademiia Nauk, Doklady (ISSN 0366-8681), vol. 38, no. 1, 1985, p. 137-139. refs

The role of renal prostaglandins as mediators of the increased renal production of erythropoietin (EP) in acute hypobaric hypoxia is investigated experimentally in male Wistar rats, comparing the EP production of normal controls, normal rats exposed to hypoxia at 0.42 atm for 4.5 h immediately prior to collection of blood for EP-activity assay, rats given 5 mg/kg indomethacin (an inhibitor of prostaglandin synthesis) 22.5 and 5.5 h before EP-assay bleeding, and indomethacin-treated rats exposed to hypoxia. The results are presented in graphs, and indomethacin is found to completely inhibit the 70-percent increase in EP activity observed in the untreated hypoxic rats. This result is consistent with the finding of Nachev et al. (1983) that indomethacin blocks the hypoxia-induced increase in plasma renin activity. T.K.

A85-31069

EFFECTS OF MUSCLE CONTRACTION ON PULSATILE PRESSURE-FLOW RELATIONS IN FEMORAL BED

C. R. LAMBERT, L. B. GLADDEN, W. W. NICHOLS, and C. J. PEPINE (Florida, University; U.S. Veterans Administration, Medical Center, Gainesville, FL; Louisville, University, Louisville, KY) (Federation of American Societies for Experimental Biology, Spring Meeting, St. Louis, MO, Apr. 1-6, 1984) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, April 1985, p. 1128-1135. refs

Femoral arterial pressure-flow relations and vascular impedance were studied during isometric contractions of the gastrocnemius-plantaris muscle group in dogs. Muscle contractions were synchronized with the electrocardiogram to occur in the first or second half of the cardiac cycle. The effects of fatigue and recovery were also documented. Marked changes in pressure and flow waveforms, and corresponding femoral arterial input impedance spectra were observed for all three contraction modes; which included twitches, and tetanuses of low, intermediate and high frequencies. It is shown that all tetanuses placed in the first half of the cardiac cycle produced a consistent reversal of impedance phase for the fundamental harmonic from negative to positive values. During recovery from the contractions, impedance spectra were unchanged from control spectra. Some possible mechanisms for the waveform changes are discussed, including increased wave reflection due to muscle contraction and the generation of a retrograde pulse by contracting muscle. I.H.

A85-31503

DIAGNOSTIC AND PROGNOSTIC SIGNIFICANCE OF THE DETERMINATION OF THE CONTENT OF CYCLIC NUCLEOTIDES DURING DISTURBANCES OF HEART RHYTHM [DIAGNOSTICHESKOE I PROGNOSTICHESKOE ZNACHENIE OPREDELENIIA SODERZHANIIA TSIKLICHESKIKH NUKLEOTIDOV PRI NARUSHENIIAKH SERDECHNOGO RITMA]

G. I. DOROFEEV, I. N. SHANIN, N. V. EFIMOV, and V. T. IVASHKIN (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Feb. 1985, p. 59, 60. In Russian.

A85-31547

PHYSIOLOGICAL EFFECTS OF BOMBESIN [FIZIOLOGICHESKIE EFFEKTY BOMBEZINA]

P. K. KLIMOV, A. T. MARIANOVICH, E. L. POLIAKOV, I. L. KURANOVA, and S. I. CHURKINA (Voenno-Meditsinskaia Akademiia; Akademiia Nauk SSSR, Institut Fiziologii; Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 71, Feb. 1985, p. 145-170. In Russian. refs

Research concerning the effects of bombesin on the central nervous system (including behavioral responses), thermoregulation, and gastrointestinal organs is reviewed. Experimental data on the synthesis and immunohistochemistry of bombesin and related peptides are examined. B.J.

A85-31548

SHORT-TERM EFFECT OF HEAT ON THE ADRENO- AND CHOLINO-SENSITIVITY OF THE RAT SMALL INTESTINE [VLIANIE KRATKOVREMENNOGO DEISTVIA TEPLA NA ADRENO- I KHOLINOKHUVSTVITEL'NOSTI' TONKOI KISHKI KRYSY]

KH. A. MEZIDOVA, B. N. MANUKHIN, and F. F. SULTANOV (Akademiia Nauk SSSR, Institut Biologii Razvitiia, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 71, Feb. 1985, p. 195-199. In Russian. refs

The dynamics of the adreno- and cholino-sensitivity (ACS) of isolated fragments of the small intestine of Wistar rats exposed to a temperature of 45 C for 30 and 60 min was investigated in the course of 10 days. An increase in ACS under hyperthermia was observed, a significant correlation existing between body temperature and adreno-reactivity. The normalization of body temperature is followed by reciprocal changes in ACS. B.J.

A85-31894

THE PHYSIOLOGY OF ELECTRORECEPTORS [FIZIOLOGIIA ELEKTRORESEPTOROV]

G. R. BROUN and O.B. ILINSKII (Leningrad, Izdatel'stvo Nauka, 1984, 248 p. In Russian. refs

A survey of current problems in the study of the physiological characteristics of electroreceptor organs in animals is presented. Attention is given to the sensory structure of lower lateral-line organs for the perception of electric fields in water. On the basis of current data from animal experiments, the morphological, physico-chemical, and functional properties of electroreceptors are described. An analysis is given of the physical mechanisms for the reception of electric charges, the sensitivity of electroreceptors to magnetic fields, and the nonelectric factors of electroreceptor function. I.H.

51 LIFE SCIENCES (GENERAL)

A85-31898

BLOOD CIRCULATION AND AGING [KROVOOBRAZHENIE I STARENIE]

V. V. FROLKIS, V. V. BEZRUKOV, and V. G. SHERCHUK
Leningrad, Izdatel'stvo Nauka, 1984, 126 p. In Russian. refs

An analysis of the metabolic and functional changes which occur in the cardiovascular system as a result of aging is presented. The available medical data are reviewed concerning age related changes in general hemodynamics, adrenergic and cholinergic regulation; and hormonal control. Particular attention is given to the limited state of coronary blood circulation in older men and women. On the basis of the available experimental data, the age-related aspects of cardiovascular disease are discussed, including cardiac blood insufficiency, arterial hypertension, and coronary blood insufficiency. Attention is also given to the physiological effects of the various pharmaceutical preparations used in the treatment of cardiac disorders in older men and women. I.H.

A85-32171

FILAMENTOUS MICROFOSSILS FROM THE 3,500-MYR-OLD ONVERWACHT GROUP, BARBERTON MOUNTAIN LAND, SOUTH AFRICA

M. M. WALSH and D. R. LOWE (Louisiana State University, Baton Rouge, LA) Nature (ISSN 0028-0836), vol. 314, April 11, 1985, p. 530-532. refs
(Contract NSF EAR-78-19908)

The Swaziland Supergroup of Barberton Mountain Land, South Africa, is held to be a promising location for the earth's oldest fossils in virtue of its carbonaceous matter-bearing, well preserved and ancient sedimentary rocks. Attention is presently given to the discovery of numerous filaments from two different stratigraphical positions in the 3.5 billion year-old Onverwacht Group of the Swaziland Supergroup. The morphologies and abundance of the filaments furnish evidence for the existence of either bacteria- or cyanobacteria-like organisms during the early Archean, supporting recent reports of similar, filamentous microfossils from 3.5 billion year-old rocks in Western Australia. O.C.

A85-32760

EFFECT OF SERIOUS TRAUMA ON DECOMPRESSION SICKNESS [VLIANIE TIAZHELOI TRAVMY NA DEKOMPRESSIONNIU ZABOLEVAEMOST']

M. A. LUSHCHITSKII, A. P. MASNIOV, and I. U. P. SHUMSKII
Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Jan. 1985, p. 35-37. In Russian. refs

Experiments were performed on cats to assess the effects of serious trauma (wounds or surgery) on decompression sickness and how the treatment of this sickness should be altered in the presence of trauma. Results indicate that trauma leads to a reduction in the frequency and markedness of clinical manifestations of decompression sickness and to a statistically reliable increase in the latency period of the decompression sickness on the ninth day of the posttrauma period. This may be connected with functional denervation of tissues and with a decrease in the responsivity of the body to decompression gas-evolution. B.J.

A85-32766

THE CORRECTION OF THE LIPID METABOLISM OF RATS WITH RESTRICTED MOBILITY DUE TO CHANGING MAGNETIC FIELD OF VERY LOW FREQUENCY [KORREKTSIIA LIPIDNOGO OBMENA U KRYA S OGRANICHENNOI PODVIZHNOST'IU PEREMENNOM MAGNITNOM POLE INFRANIZKOI CHASTOTY]

N. A. TEMURIANTS, E. V. EVSTAFIEVA, and V. B. MAKEEV
(Simferopol'skii Gosudarstvennyi Universitet, Simferopol, Ukrainian SSR) Biofizika (ISSN 0006-3029), vol. 30, Mar.-Apr. 1985, p. 313-316. In Russian. refs

A85-32767

THE THEORY OF REGULATION OF THE CONTRACTILE FORCE OF THE HEART MUSCLE [K TEORII REGULIATSII SILY SOKRASHCHENII SERDECHNOI MYSHTSY]

V. S. MARKHASIN, G. N. MILSHEIN, and O. E. SOLOVEVA
(Nauchno-Issledovatel'skii Institut Gigeny Truda i Profzabolevani; Ural'skii Gosudarstvennyi Universitet, Sverdlovsk, USSR) Biofizika (ISSN 0006-3029), vol. 30, Mar.-Apr. 1985, p. 322-327. In Russian. refs

A numerical model of rhythmoinotropic phenomena in the heart muscle is proposed. The kinetics of calcium flowing in intracellular pools of cardiomyocytes is described in a series of differential equations, with dimensionless values serving as coefficients. The amount of calcium freed into the myoplasm is obtained, and the connection between the dimensionless values and the intervals between contractile stimuli is determined. The concept of the S-pool is introduced in order to provide a quantitative description of the effects of postextrasystolic potentiation and paired stimulation. The S-pool concept makes it possible to model all experimental results obtained for isolated myocardia in warm-blooded animals. I.H.

A85-32768

THE FORMATION OF GAS BUBBLES IN BIOLOGICAL TISSUES DUE TO DECOMPRESSION (A MATHEMATICAL MODEL) [FORMIROVANIE GAZOVYKH PUZYREI V BIOLOGICHESKIKH TKANIAXH PRI DEKOMPRESSII /MATEMATICHESKOE MODELIROVANIE/]

I. U. IA. KISLIAKOV and A. V. KOPYLTISOV (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Biofizika (ISSN 0006-3029), vol. 30, Mar.-Apr. 1985, p. 337-340. In Russian. refs

A mathematical model of gas transport between a decompression bubble and the surrounding biological tissues is developed. On the basis of the numerical results, the influence of the gas mixture and density of bubble-forming centers on the bubble growth rate is determined, and the physical mechanisms of CO₂ bubble formation are identified. It is shown that bubbles of He grow faster than bubbles of N₂ gas. A decrease in external pressure of a factor of 5-10 over 1-2 seconds permits the formation of bubbles larger than the maximum hemodynamic limit for effective circulation. I.H.

A85-32769

BIOLOGICAL STUDIES ON THE SALYUT ORBITAL STATIONS [BIOLOGICHESKIE ISSLEDOVANIIA NA ORBITAL'NYKH STANTSIIAXH 'SALIUT']

N. P. DUBININ, ED. Moscow, Izdatel'stvo Nauka, 1984, 262 p. In Russian. No individual items are abstracted in this volume.

Results of biological experiments performed on the Salyut stations are presented. Particular emphasis is placed on: scientific equipment and conditions for conducting biological experiments on scientific orbital stations; the effect of space flight factors on biopolymers and prebiological matter; experiments with lower and higher plants; experiments with animal cell cultures; studies with insects; experiments with vertebrates; the biological effect of heavy particles of galactic cosmic rays; and ground-based simulation experiments and test systems for the analysis of the biological effects of space flight. B.J.

A85-32775

SYMMETRY OF THE NETWORK OF METABOLIC REACTIONS [SIMMETRIIA SETI REAKTSII METABOLIZMA]

A. G. MALYGIN Moscow, Izdatel'stvo Nauka, 1984, 137 p. In Russian. refs

An approach to the systematization of metabolism information is proposed which is based on the idea of the structural-chemical symmetry of the network of metabolic reactions. The presence of symmetry in the metabolic network is grounded theoretically, and the possibility of using this symmetry representation to systematize metabolism information is examined. A map is included which depicts the system of metabolic pathways as a network of reactions with periodic similar complexes of reactions. B.J.

A85-32976

DIFFERENTIAL EFFECT OF AMINO ACID RESIDUES ON THE STABILITY OF DOUBLE HELICES FORMED FROM POLYRIBONUCLEOTIDES AND ITS POSSIBLE RELATION TO THE EVOLUTION OF THE GENETIC CODE

D. PORSCHKE (Max-Planck-Institut fuer Biophysikalische Chemie, Goettingen, West Germany) Journal of Molecular Evolution (ISSN 0022-2844), vol. 21, no. 2, 1984-1985, p. 192-198. refs

A85-33186

EFFECT OF CALCIUM-CHANNEL BLOCKERS ON THE ELECTROMECHANICAL ACTIVITY OF THE FROG MYOCARDIUM UNDER RHYTHMIC STIMULATION AND IN REST [DEISTVIE BLOKATOROV KAL'TSIEVYKH KANALOV NA ELEKTROMEKHANICHESKUIU AKTIVNOST' MIOKARDA LIAGUSHKI PRI RITMICHESKOI STIMULIATSII I V POKOE]

V. I. GENDVILENE, R. A. MACHIANSKENE, and E. V. NARUSHIAVICHUS (Kaunasskii Gosudarstvennyi Meditsinskii Institut, Kaunas, Lithuanian SSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 281, no. 2, 1985, p. 444-447. In Russian. refs

A85-33187

ALPHA-TOCOPHEROL AS A POSSIBLE STABILIZER OF SYNAPOTOSOMAL MEMBRANES AGAINST THE DAMAGING EFFECT OF PHOSPHOLIPASE A2 [ALPHA-TOKOFEROL - VOZMOZHNYI STABILIZATOR MEMBRAN SINAPOTOSOM OT POVREZHDAIUSHEGO DEISTVIA FOSFOLIPAZY A2]

A. N. ERIN, V. A. TURIN, N. V. GORBUNOV, V. I. BRUSOVANIK, and L. L. PRILIPKO (Akademiia Meditsinskikh Nauk SSSR, Vsesoiuznyi Nauchnyi Tsentr Psikhicheskogo Zdorov'ia; Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 281, no. 2, 1985, p. 447-450. In Russian. refs

N85-23291# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ANALYSIS OF BIOLOGICAL PARTICLES BY MASS SPECTROMETRY Final Technical Report, Jun. 1981 - Jun. 1984M. P. SINHA 23 Oct. 1984 145 p
(Contract MIPR-50-81; MIPR-119-84)
(AD-A149952; ARO-18137.5-CH) Avail: NTIS HC A07/MF A01 CSCL 06M

A new method has been developed for the rapid characterization of aerosol particles of biological nature using the technique of Particle Analysis by Mass Spectrometry (PAMS). PAMS is a combination of particle beam generation with mass spectrometry. Mass spectral measurements were made on individual biological aerosol particles using this method. The generation of mass spectra directly from aerosols on a single particle basis makes PAMS a unique method for the detection and identification of biological particles in air on an instantaneous basis. Aerosols of various organic compounds, and microorganisms were produced by nebulizing their suspensions, and were introduced into the ion source of a quadrupole mass spectrometer in the form of a beam. It is found that the particle beam method provides a well-controlled means for introducing one particle at a time into the ion source. Two methods for the volatilization and ionization of particles were studied: thermal volatilization followed by electron impact ionization, and laser-induced volatilization and ionization. GRA

N85-23292# Brookhaven National Lab., Upton, N. Y. Biology Dept.

MODULATION OF LIGHT ENERGY TRANSDUCTION IN PHOTOSYNTHESISJ. BENNETT Jul. 1984 9 p refs Presented at the 9th Intern. Congr. on Photobiology, Philadelphia, 3 Jul. 1984
(Contract DE-AC02-76CH-00016)
(DE85-004711; BNL-35577; CONF-840783-4) Avail: NTIS HC A02/MF A01

Modulation of light energy transduction in photosynthesis is discussed. Specific topics discussed include: (1) longer term

modulation of light energy transduction; (2) the photoinhibition of photosystem-2 activity in plants exposed to high light intensities; (3) the molecular basis of chilling sensitivity in plants; and (4) the adaptation of cyanobacteria to changes in light quality. DOE

N85-23293# California Univ., Berkeley. Lawrence Berkeley Lab.

INTERACTION OF METALS AND METALLOIDS WITH BIOMEMBRANESR. J. MEHLHORN Sep. 1984 20 p refs Presented at Dahlem Workshop on the Importance of Chem. Speciation in Environ. Processes, Berlin, West Germany, 2 Sep. 1984
(Contract DE-AC03-76SF-00098)
(DE85-004902; LBL-17925; CONF-8409199-1) Avail: NTIS HC A02/MF A01

The interaction of metal (loid)s with membranes can have a significant role in their biological effects. To the extent that membranes prevent the entry of these species into cells, they will inhibit damaging effects. However, many interactions with membranes can result in direct damage, or, more seriously, can lead to an amplification of toxicity. Direct damage can include structural alteration such as a disruption of vital lipid-protein associations on introduction of new surface changes. More substantial damage can occur when metals or metalloids act catalytically to impair membrane function, e.g., by providing ion conductance pathways or by promoting free radical reactions which may cause massive oxidation of membrane lipids. Factors involved in the interaction of compounds with membranes are studied. DOE

N85-24694*# National Aeronautics and Space Administration, Washington, D. C.

PROBLEMS OF SPACE BIOLOGY. VOLUME 50: NYSTAGMOMETRY FOR EVALUATION OF THE STATUS OF THE VESTIBULAR FUNCTIONM. M. LEVASHOV and V. A. KISLYAKOV, ed. Apr. 1985 246 p refs Transl. into ENGLISH of the book "Problemy Kosmicheskoy Biologii, Tom 50. Nistagometriya v Otsenke Sostoyaniya Vestibulyarnoy Funktsii" Leningrad, Nauka Press, 1984 p 1-221 Transl. by The Corporate Word, Pittsburgh
(NASA-TM-77616; NAS 1.15:77616) Avail: NTIS HC A11/MF A01 CSCL 06B

Various aspects of nystagmometry are studied, primarily those in which the study of nystagmus serves as a means to learn about the vestibular apparatus. Along with exhaustive published material, the monograph presents data from many years of research on the physiological mechanisms of nystagmus, the features of nystagmus when vestibular stimulation is combined with optokinetic, the pole of vestibular afferentation asymmetry in the asymmetry of reactions to optokinetic stimulus, a nystagmometric approach to studying the hydrodynamic interaction among semicircular canals, as well as several other questions. A great deal of attention is given to methods of recording nystagmus, calibrating nystagmograms, quantitative evaluation of nystagmographic material, new nystagmometric characteristics and diagnostic techniques. A diagnostic model is proposed which makes it possible to obtain important information on the condition of the vestibular system from results of vestibular testing. B.G.

N85-24695# Massachusetts Univ., Amherst. Dept. of Psychology.

BIOLOGICAL INVESTIGATIONS OF ADAPTIVE NETWORKS. NEURONAL CONTROL OF CONDITIONED RESPONDING Annual Technical Report, 31 May 1983 - 30 Apr. 1984J. W. MOORE 20 May 1984 12 p
(Contract AF-AFOSR-0215-83)
(AD-A150959; AFOSR-85-0071TR) Avail: NTIS HC A02/MF A01 CSCL 05J

Neurobiological investigations of adaptive neural networks were initiated using the classically conditioned nictitating membrane (NM CR) of rabbit. One experimental approach involved recording from single brain neurons from awake, behaving animals for the purpose of determining the loci and characteristics of neurons with activity

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correlated with the NR CR or its inhibition. A second approach involved in the use of discrete brain lesions that selectively eliminate the NM CR while at the same time sparing the basic reflex pathway. A third approach employed fiber-tracing anatomical techniques designed to clarify the interconnectivity among brain regions essential for the NM CR. These regions include discrete portions of the cerebellum and brain stem. Information from physiological studies have been incorporated into mathematical models of learning used by adaptive network researchers, and anatomical findings have guided the development of related neuronal models. GRA

N85-24696# California Univ., Berkeley. Lawrence Berkeley Lab. Biology and Medicine Div.

NMR IMAGING AND SPECTROSCOPY OF THE MAMMALIAN CENTRAL NERVOUS SYSTEM AFTER HEAVY ION RADIATION **Ph.D. Thesis**

T. RICHARDS Sep. 1984 242 p refs
(Contract DE-AC03-76SF-00098)

(DE85-004509; LBL-18148) Avail: NTIS HC A11/MF A01

NMR imaging, NMR spectroscopic, and histopathologic techniques used to study the proton relaxation time and related biochemical changes in the central nervous system after helium beam in vivo irradiation of the rodent brain. The spectroscopic observations were made possible by development of methods for measuring the NMR parameters of the rodent brain in vivo and in vitro. Radiation induced increases were observed in lipid and p-choline peaks of the proton spectrum, in vivo. Proton NMR spectroscopy measurements on brain extracts (aqueous and organic solvents) were made to observe chemical changes that could not be seen in vivo. Radiation induced changes were observed in lactate, GABA, glutamate, and p-choline peak areas of the aqueous fraction spectra. In the organic fraction, decreases were observed in peak area ratios of the terminal methyl peaks, the N methyl groups of choline, and at a peak at 2.84 ppm (phosphatidyl ethanolamine and phosphatidyl serine resonances) relative to TMS. With histology and Evans blue injections, blood brain barrier alternations were seen as early as 4 days after irradiation. DOE

N85-24697# Joint Publications Research Service, Arlington, Va. **USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES**

25 Mar. 1985 172 p refs Transl. into ENGLISH from various Russian articles

(JPRS-UBB-85-012) Avail: NTIS HC A08/MF A01

News items, abstracts, and scientific reports on aspects of life sciences, biomedical, and behavioral sciences including virology, radiation biology, veterinary medicine, psychology, physiology, public health, electromagnetic radiation effects, pharmacology and toxicology, molecular biology, microbiology, medicine, laser effects, genetics, immunology, epidemiology, biophysics, ecology, biotechnology, biochemistry, agrotechnology, and aerospace medicine.

N85-24699# Joint Publications Research Service, Arlington, Va. **SECOND SOVIET-FRENCH SYMPOSIUM ON SPACE CYTOLOGY**

V. OVCHAROV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-012)* p 4 25 Mar. 1985 Transl. into ENGLISH from Sov. Estoniya (USSR), 1 Dec. 1984 p 3 Symp. held in Moscow, 30 Nov. 1984

Avail: NTIS HC A08/MF A01

As a part of space biology and medicine, space cytology studies the effects of space flight factors, particularly zero gravity, on the activity of life's primary units - animal and plant cells. Functional impairments which are observed during flights are reversible; disappearing following the return to Earth. It is important to develop methods and instruments which would make it possible to observe changes on the cellular level directly in space. Space cytologists have a considerable number of problems to solve - automatic methods for growing cell cultures in orbit and ascertaining how

zero gravity affects the structure, metabolism, and functions of cells. B.G.

N85-24700# Joint Publications Research Service, Arlington, Va. **WAYS OF OPTIMIZATION OF LIGHT ENERGY TRANSFORMATION IN PRIMARY STAGES OF PHOTOSYNTHESIS. NECESSITY OF OPTIMIZATION OF PHOTOSYNTHETIC UNIT STRUCTURE AND METHOD FOR CALCULATING EFFICIENCY** Abstract Only

Z. G. FETISOVA and M. V. FOK *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-012)* p 13 25 Mar. 1985 Transl. into ENGLISH from Molekulyarnaya Biol. (Moscow), v. 18, no. 6, NOV. - Dec. 1984 p 1651-1656
Avail: NTIS HC A08/MF A01

Various primary photosynthetic processes were studied to determine energy migration and light accumulation factors. Results have shown that quantum yield of primary energy charges in reaction centers occur only with pronounced optimization of photosynthetic unit parameters. A system with a given number of reaction centers and light collecting antennas with calculated numbers of molecules was studied. With rapid energy migration the upper limit of quantum yield of primary charge requires three experimental parameters, but even with these, calculated and experimental results diverge sharply. Thus, the structure of photosynthetic units in vivo must be optimized for accurate results. A high rate of energy migration alone did not provide high transmission of energy from antennas to reaction center. A new method was composed for calculating input output values. The introduction of a parameter for spectral heterogeneity of the antenna reduced the number of stages in energy migration by a factor of 4, while time involved was cut in half. Author

N85-24701# Joint Publications Research Service, Arlington, Va. **WAYS OF OPTIMIZATION OF LIGHT ENERGY TRANSFORMATION IN PRIMARY STAGES OF PHOTOSYNTHESIS. OPTIMIZATION OF LATTICE STRUCTURE OF UNIFORM PHOTOSYNTHETIC UNIT** Abstract Only

Z. G. FETISOVA, M. V. FOK, L. V. SHIBAYEVA, and A. Y. BORISOV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-012)* p 14 25 Mar. 1985 Transl. into ENGLISH from Molekulyarnaya Biol. (Moscow), v. 18, no. 6, Nov. - Dec. 1984 p 1657-1663

Avail: NTIS HC A08/MF A01

The structure of the macroscopic lattice of a given type and modeled energy transfer of photosynthetic unit structure (PUS) antenna, suggesting its inductive resonance mechanism and dipole-dipole interaction between kmolecules during energy transfer were studied. A right angle lattice with infinite two dimensional aggregates, formed with the help of translational symmetry. Parameters of the model are discussed. Results suggest two consequences for in vivo systems; the PUS macroantenna display a specific anisotropy of intermolecular spaces, then an elongated form will emerge, and if the reaction centers in vivo are grouped into clusters, then the light collecting antennas cannot be uniform and isotropic. Author

N85-24705# Joint Publications Research Service, Arlington, Va. **EFFECT OF BROAD-BAND CONSTANT NOISE ON SOME SYSTEMS OF ANIMAL BODY** Abstract Only

L. V. POCHOBUT *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-012)* p 117 25 Mar. 1985 Transl. into ENGLISH from Gigiyena i Sanit. (Moscow), no. 11, Nov. 1984 p 36-38

Avail: NTIS HC A08/MF A01

The nature of response reactions of the animal body to one time effect of broad band noise at the 83 decibel A level for 3 hours are described and discussed. The functional state of the central nervous system, cardiovascular system and some metabolism parameters were studied in 12 rabbits (wt 2100 to 2600 g). Single effect of the noise caused reduction of bioelectrical activity of the rabbit brain, especially the alpha rhythm. The noise used caused insignificant hypertension (3.3 percent), increase of heart rate and increase of contractile capacity of the myocardium

(by change of the QRS wave) but did not affect auricular or intraventricular conductivity. The functional shifts shown were attributed to the effect of regulation of physiological equilibrium in the system and not to any pathological reaction. It was recommended that these bodily changes in reaction to noise may be used to develop a method of individual sensitivity to noise.

Author

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

A85-30423

HAND GRIP STRENGTH DECREASE RELATED TO HAND SKIN TEMPERATURE DROP DURING SIX-HOUR ICE COLD WATER IMMERSION

R. ILMARINEN (Institute of Occupational Health, Helsinki, Finland) *SAFE Journal*, vol. 15, Spring 1985, p. 16-20. refs

Hand skin temperature (HTsk) and hand grip strength (HGS) in ten young, medically screened female (5) and male (5) volunteers were studied during 6-h ice cold water immersions conducted according to the IMO recommendation (MSC 48/25) for the testing of thermal protective qualities of different insulated buoyant survival suits. HTsk was measured by means of a thermistor taped to the skin, HGS by a special dynamometer. During the first two hours HTsk decreased 12 C (from 29 C to 17 C) on an average, HGS about 30 percent. The following decreases in both parameters were markedly slower; the mean changes in four hours were about 40 C in HTsk and from 0 up to 10 percent in HGS. The results indicate that the HTsk decrease during prolonged whole-body immersion is probably closely related to the drop in hand and forearm muscles temperatures, which at least to some extent causes the decrease in HGS. Manual functions in accidental immersion could be improved not only by better design but also by better thermal insulation of the sleeves and the gloves of survival suits.

Author

A85-30472

APPROACHES TO THE IMPROVEMENT OF METHODS FOR THE PREVENTION OF ORTHORHINOLARYNGOLOGICAL DISTURBANCES AMONG INDUSTRIAL WORKERS [SOSTOIANIE I PUTI SOVERSHENSTVOVANIIA PROFILAKTIKI ZABOLEVANIÍ LOR-ORGANOV U RABOCHIKH PROMYSHLENNYKH PREDPRIIATII]

V. E. OSTAPKOVICH (Akademiia Meditsinskikh Nauk SSSR, Nauchno-Issledovatel'skii Institut Gigieny Truda i Profzabolevanií, Moscow, USSR) *Vestnik Otorinolaringologii* (ISSN 0042-4668), Mar.-Apr. 1985, p. 3-8. In Russian.

A85-30473

POSITIONAL NYSTAGMUS AND OTHER OTONEUROLOGIC SYMPTOMS IN THE PRESENCE OF TEMPORARY VASCULAR DISTURBANCES IN THE BRAIN [POZITSIONNYI NISTAGM I DRUGIE OTONEVROLOGICHESKIE SIMPTOMY PRI PREKHODIASHCHIKH SOSUDISTYKH NARUSHENIIAKH GOLOVNOGO MOZGA]

K. S. TANCHEV *Vestnik Otorinolaringologii* (ISSN 0042-4668), Mar.-Apr. 1985, p. 25-28. In Russian. refs

A85-30474

CEPHADOL IN THE TREATMENT OF MENIERE'S DISEASE AND LABYRINTHOPATHY [TSEFADOL V LECHENII BOL'NYKH BOLEZN'IU MEN'ERA I LABIRINTOPATIAMI]

V. P. VASILEVA and D. A. ROMANENKO (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Vestnik Otorinolaringologii* (ISSN 0042-4668), Mar.-Apr. 1985, p. 28-31. In Russian.

The results of a clinical investigation of the effectiveness of the pharmaceutical compound Cephadol in treating dizziness due to disorders of the labyrinth are presented. The drug was used to treat 21 patients with Meniere's disease and five patients with a history of labyrinthitis. The results of the drug treatment were evaluated on the basis of the subjective feelings of the patients, and the results of otoneurological and audiological examinations. It is shown that the drug was effective in relieving dizziness in 20 out of the 26 patients studied.

I.H.

A85-30475

AUTOMATED ANALYSIS OF VESTIBULAR NYSTAGMUS [AVTOMATIZIROVANNYI ANALIZ VESTIBULIARNOGO NISTAGMA]

I. A. SKLIUT (Belorusskii Nauchno-Issledovatel'skii Institut Nevrologii, Neurokhirurgii i Fizioterapii, Minsk, Belorussian SSR) and V. I. PIVRIKAS (Klaipedskaia Klinika, Klaipeda, Lithuanian SSR) *Vestnik Otorinolaringologii* (ISSN 0042-4668), Mar.-Apr. 1985, p. 70-74. In Russian. refs

Current efforts to develop a computerized system for the analysis of vestibulometer data are briefly reviewed. Consideration is given to the hardware requirements of the system, and to the savings in man hours and treatment already achieved by experimental computerized nystagmus analyzers in Hungary, East Germany, and the USSR. The possibility of developing a universal standard for vestibulometer data processing is also discussed.

I.H.

A85-31068

RESPONSE OF VENTILATORY AND LACTATE THRESHOLDS TO CONTINUOUS AND INTERVAL TRAINING

D. C. POOLE and G. A. GAESSER (California, University, Los Angeles, CA) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, April 1985, p. 1115-1121. refs

The effects of continuous and interval training on changes in lactate and ventilatory thresholds during incremental cycle ergometer exercise have been investigated experimentally. Exercise was assigned to seventeen males subjects according to three different training regimes: 55 minutes of continuous exercise at about 50 percent maximum O₂ consumption ($\dot{V} \text{ O}_2 \text{ max}$); 35 minutes of continuous exercise at about 70 percent $\dot{V} \text{ O}_2 \text{ max}$; and 10 x 2-minute intervals of exercise at 105 percent $\dot{V} \text{ O}_2 \text{ max}$, interspersed with 2-minute rest intervals. Lactate threshold (LT) and ventilatory threshold (VT) were determined using a standard incremental exercise test before and after 4 and 8 wk of training. It is found that $\dot{V} \text{ O}_2 \text{ max}$ increased significantly in all three groups. Increases in LT were also the same for all three exercise regimes. The increase in VT for the interval training group was found to be significantly higher than for the continuous exercise groups. On the basis of the experimental results, it is concluded that LT and VT cannot be used interchangeably as indices of training adaptations.

I.H.

A85-31070

REFLEX COMPENSATION OF SPONTANEOUS BREATHING WHEN IMMERSION CHANGES DIAPHRAGM LENGTH

M. B. REID, R. B. BANZETT, H. A. FELDMAN, and J. MEAD (Harvard University, Boston, MA) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, April 1985, p. 1136-1142. refs (Contract NIH-HL-07118; NIH-HL-19170)

Measurements of tidal volume (VT), chest wall dimensions, end-tidal CO₂ pressure, and respiratory muscle electromyograms were obtained for nine seated subjects immersed in water in order to study the reflex compensation of spontaneous breathing due to immersion-induced diaphragm changes. It is found that peak inspiratory activity decreased in the diaphragm and the inspiratory

intercostal muscles; inspiratory time (IT), respiratory frequency (f), and VT remained unchanged. Operational length compensation of the diaphragm during immersion was also observed. The changes in inspiratory muscle activity were not attributed to altered chemical drive or to voluntary response, but rather to mechanoreceptive reflexes which employ afferent information from the lungs or diaphragm to adjust inspiratory muscle activities. I.H.

A85-31071**HEMODYNAMIC EFFECTS OF EPINEPHRINE - CONCENTRATION-EFFECT STUDY IN HUMANS**

J. R. STRATTON, M. A. PFEIFER, J. L. RITCHIE, and J. B. HALTER (U.S. Veterans Administration, Medical Center; Washington, University, Seattle, WA) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, April 1985, p. 1199-1206. Research supported by the U.S. Veterans Administration. refs (Contract NIH-AG-01926)

A85-31072**KINETICS OF O₂ UPTAKE AND RELEASE BY HUMAN ERYTHROCYTES STUDIED BY A STOPPED-FLOW TECHNIQUE**

K. YAMAGUCHI (Keio University, Tokyo, Japan; Max-Planck-Institut fuer experimentelle Medizin, Goettingen, West Germany), P. SCHEID (Bochum, Ruhr-Universitaet Bochum; Max-Planck-Institut fuer experimentelle Medizin, Goettingen, West Germany), D. NGUYEN-PHU, and J. PIIPER (Max-Planck-Institut fuer experimentelle Medizin, Goettingen, West Germany) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, April 1985, p. 1215-1224. refs

The kinetics of O₂ uptake and release in human erythrocytes at 37 C was investigated experimentally using a stopped-flow technique. A specific O₂ transfer conductance for erythrocytes (GO₂) was calculated on the basis of the time course of O₂ saturation. The following results are obtained: (1) GO₂ decreased in the course of O₂ uptake but initial GO₂ was nearly independent of saturation changes; (2) the addition of albumin to the medium reduced GO₂; (3) increasing the dithionite concentration in the medium during O₂-release progressively enhanced GO₂, which became virtually constant for the entire course of release; and (4) O₂ uptake and O₂ release in the same range of O₂ saturation between 0.3 and 0.8 yielded nearly identical O₂ levels. The average transfer conductance for O₂ in whole blood was estimated to be 3.9 ml per min torr/ml blood. I.H.

A85-31073**CENTRAL AND PERIPHERAL CAUSES OF HYPERREFLEXIA IN HUMANS BREATHING 5 PERCENT TRIMIX AT 650 M**

J. L. PARMENTIER, D. J. HARRIS, and P. B. BENNETT (Duke University, Medical Center, Durham, NC) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, April 1985, p. 1239-1245. refs

(Contract NIH-GM-24936; NIH-HL-07896)

Comparative studies of stretch (T) and Hoffman (H) reflexes were carried out in order to clarify the mechanisms of increased stretch reflex responsiveness in three divers breathing 5 percent N₂-O₂-balance He at a pressure of 650 m in seawater. Electromyography revealed increases of up to 160 percent in the T reflex recruitment ratio of up to 160 percent as compared with surface controls. The H reflex recruitment ratio did not change significantly. On the basis of the experimental results it is concluded that hyperbaric hyperreflexia is mainly due to increased muscle spindle sensitivity which initiates gamma-motoneuron activity. Increases of 100-200 percent in peak muscle twitch force are reported and provide evidence that pressure can directly influence peripheral human physiology. Postreflex clonic potentials during voluntary plantar flexion were significantly increased in both amplitude and number following deep diving. I.H.

A85-31074**COMPARISON OF CARDIAC OUTPUT DURING EXERCISE BY SINGLE-BREATH AND CO₂-REBREATHING METHODS**

M. D. INMAN, R. L. HUGHSON, and N. L. JONES (Waterloo, University, Waterloo; McMaster University, Hamilton, Ontario, Canada) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, April 1985, p. 1372-1377. Research supported by the Ontario Heart Foundation. refs

Cardiac output was estimated at rest in a supine position and during cycling exercise in an upright position in five men and one woman. At least four repetitions of both the CO₂-rebreathing plateau method and the single-breath method developed by Kim et al. (1966) were used. It is found that estimates of cardiac output were the same using both techniques during rest and during exercise. However, at higher work rates, the single-breath method significantly underestimated the value cardiac output obtained by CO₂-rebreathing. The reason for the difference in cardiac output estimates by the two methods was attributed to the determination of arterial partial pressure and mixed venous partial pressure. The estimate of arterial CO₂ partial pressure from the single breath method was about 88.5 percent of the estimate of arterial CO₂ partial pressure from end-tidal arterial CO₂ partial pressure using the single rebreathing method. The differences in measurements of cardiac output was not eliminated by using a logarithmic form of the CO₂ dissociation curve with the single-breath method. I.H.

A85-31194* Northeastern Univ., Boston, Mass.**PERCEIVED MAGNITUDE OF TWO-TONE-NOISE COMPLEXES - LOUDNESS, ANNOYANCE, AND NOISINESS**

R. P. HELLMAN (Northeastern University, Boston, MA) *Acoustical Society of America, Journal* (ISSN 0001-4966), vol. 77, April 1985, p. 1497-1504. NASA-supported research. refs

An investigation of the perceived effects of tonal components was undertaken to establish a broader data base for quantification and prediction of annoyance of sounds containing added tones. The current study was concerned with two-tone-noise complexes. The stimuli were tone pairs added to a low-pass noise that was attenuated by 5 dB/oct above 600 Hz. Overall perceived magnitude is shown to be a function of the frequency separation (Delta F) between the tonal components, tone-to-noise ratio, and the overall SPL of the noise-tone complex. Results obtained with two tones are compared to those obtained in an earlier study by Hellman (1984) with single tones. The observed effects appear relevant to the rules governing loudness summation across frequency, to measurements of psychoacoustic consonance and roughness, and to the issue of mutual masking among the component stimuli. The implications of the findings in relation to proposed tone-correction procedures are also discussed. Author

A85-31501**ELECTROACUPUNCTURE DIAGNOSIS IN THE STUDY OF THE FUNCTIONAL PHYSIOLOGICAL STATE OF PILOTS [ELEKTROPUNKTURNIAIA DIAGNOSTIKA V ISSLEDOVANII FUNKTSIONAL'NOGO SOSTOIANIIA ORGANIZMA LETCHIKOV]**

V. A. BODROV, A. N. KOLTSOV, and V. V. NEMIROV (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Feb. 1985, p. 48-50. In Russian. refs

Experiments are described which demonstrate that electroacupuncture can be used as a rapid technique to evaluate the functional states of flight crews. In particular, it has been shown that to diagnose fatigue or overfatigue it is sufficient to measure the electrical conductivity at representative Ryodoracu points of the H3-H6 meridians. Fatigue is characterized by a decrease of the electrical conductivity at these points, while overfatigue is also characterized by increasing asymmetry at corresponding biological, active points of the left and right branches of the meridians. B.J.

A85-31502

EVALUATION OF THE DEGREE OF VITAMIN-C SUPPLY IN SAILORS IN THE TROPICS [OTSENKA OBESPECHENNOSTI ORGANIZMA VITAMINOM C U MORIAKOV V TROPIKAKH]

V. V. BERDYSHEV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Feb. 1985, p. 51-53. In Russian.

The information content of various indices of the degree of vitamin-C supply was evaluated in 115 healthy sailors and in 39 sailors who suffered from functional disturbances during tropical voyages. It is shown that the most informative indices are the concentration of vitamin-C in the blood plasma in conditions of rest and the excretion of the vitamin in the morning urine before breakfast after night rest.

B.J.

A85-31504

ANTIHYPOXIC EFFECT OF GUTIMIN DURING ACUTE POISONING WITH ORGANIC PHOSPHORUS COMPOUNDS [ANTIGIPOKSIKESKOE DEISTVIE GUTIMINA PRI OSTRYKH OTRAVLENIYAKH FOSFORORGANICHESKIMI VESHCHESTVAMI]

G. A. KUZOVKOV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Feb. 1985, p. 61. In Russian.

A85-31573

THE EFFECT OF DIBUNOL ON SEVERAL PHYSIOLOGICAL INDICES IN HEALTHY PEOPLE [VLIANIE DIBUNOLA NA RIAD FIZIOLOGICHESKIKH POKAZATELEI U PRAKTICHESKI ZDOROVYKH LIUDEI]

T. L. NADZHARIAN, G. N. PIKOVSKAIA, V. A. BARSEL, V. B. MAMAEV, L. A. EROVICHENKOVA, L. S. EVSEENKO, I. V. KRAVCHUK, I. V. KRAVCHENKO, N. T. GRANKOVA, L. M. CHURKINA (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) et al. Akademiia Nauk SSSR, Izvestiia, Seriya Biologicheskaya (ISSN 0002-3329), Mar.-Apr. 1985, p. 211-218. In Russian. refs

The effect of the pharmaceutical preparation dibunol on various physiological indices was studied in 10 generally healthy patients for a period of 3 months. The purpose of the experiment was to identify the possible applications of dibunol as an inhibitor of free-radical reactions in the blood and as an antioxidant. The daily dose used in the experiments was 20 mg/kg, and the specific physiological indices included: the concentration of dibunol in the blood; the state of humoral immunity; and the functional state of the liver. The functional state of the kidneys; hemopoiesis and the rate of lipid exchange were also monitored at regular periods during the test periods. It is shown that dibunol treatment reduced the elasticity modulus of the elastic blood vessels, and variations were observed in the fibronolytic activity of the blood following dibunol treatment. The experimental data are reproduced in a series of tables.

I.H.

A85-31892

THE NONSPECIFIC MECHANISMS OF HUMAN ADAPTATION [NESPETSIFICHESKIE MEKHANIZMY ADAPTATSII CHELOVEKA]

I. A. SAPOV and V. S. NOVIKOV Leningrad, Izdatel'stvo Nauka, 1984, 148 p. In Russian. refs

Consideration is given to the significant role of nonspecific physiological mechanisms in human adaptation to extreme environments. It is shown that nonspecific adaptive reactions reflect the general regularities of the adaptogenic process, and can be used as an effective criteria for determining the effectiveness of human adaptation to different extreme conditions. Data are presented concerning the role of biorhythmic changes in adaptogenic mechanisms, and the circadian and seasonal rhythms of nonspecific protective mechanisms in the blood are analyzed. Some possible reasons for the failure of protective systems in an organism are examined, and the nonspecific mechanisms for human resistance to colds in northern latitudes are discussed. The cellular nonspecific mechanisms for maintaining homeostasis are also considered.

I.H.

A85-32761

PATHOLOGICAL CHANGES IN THE INTERNAL ORGANS AFTER BURN INJURY [PATOLOGICHESKIE IZMENENIYA VNUUTRENNIYKH ORGANOV POSLE OZHOGOVOI TRAVMY]

V. A. IAKOVLEV and M. G. PELISOV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Jan. 1985, p. 37-40. In Russian.

A85-32762

PHYSIOLOGICAL RESPONSES IN HUMANS AFTER A FLIGHT TO A REGION WITH A HOT CLIMATE [FIZIOLOGICHESKIE REAKTSII CHELOVEKA PRI PERELETE V RAION S ZHARKIM KLIMATOM]

A. N. AZHAEV, A. N. KOLTISOV, V. A. EFIMOV, and L. D. RAPOPORT Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Jan. 1985, p. 53-55. In Russian.

A85-32764

PREVENTION OF ACOUSTIC TRAUMA IN MILITARY PERSONNEL [PROFILAKTIKA AKUSTICHESKOI TRAVMY U VOENNOSLUZHASHCHIKH]

I. U. K. REVSKOI and V. V. DISKALENKO Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Jan. 1985, p. 64-66. In Russian.

A85-32765

THE RELAXATION DYNAMICS OF A TRIBOELECTRIC CHARGE ON THE STRATUM CORNEUM EPIDERMAL LAYER OF THE SKIN [O DINAMIKE RELAKSATSII TRIBOZARIADA NA POVERKHNOSTI ROGOVOGO SLOIA EPIDERMISA KOZHII]

E. E. GODIK, V. A. MOROZOV, and R. F. MUSIN (Akademiia Nauk SSSR, Institut Radiotekhniki i Elektroniki, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 30, Mar.-Apr. 1985, p. 309-312. In Russian. refs

The relaxation of a triboelectric charge on the outer surface of the human epidermis (stratum corneum) has been investigated experimentally. The characteristics relaxation time was about 10-1000 seconds. The measured relaxation time was divided by the capacity of the high-resistivity peidermal layer, to yield a resistivity of 10 to the 9th - 10 to the 11th Ohms per sq m/s.

I.H.

A85-33188

EFFECT OF PROCESSES OF BUBBLE FORMATION AND GROWTH IN THE BODY ON THE SAFETY OF DECOMPRESSION REGIMES [VLIANIE PROTSESSOV OBRAZOVANIYA I ROSTA GAZOVYKH PUZYR'KOV V ORGANIZME NA BEZOPASNOST' REZHIMOV DEKOMPRESSII]

V. P. NIKOLAEV (Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 281, no. 2, 1985, p. 493-496. In Russian. refs

A85-33196

SENSITIVITY AND PRECISION OF THE OPERATION OF THE HUMAN 'PHYSIOLOGICAL THERMOSTAT' [O CHUVSTVITEL'NOSTI I TOCHNOSTI RABOTY 'FIZIOLOGICHESKOGO TERMOSTATA' CHELOVEKA]

K. P. IVANOV and N. A. SLEPCHUK (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 281, no. 3, 1985, p. 753-757. In Russian. refs

The precision of the operation of the human physiological thermostat (PT), i.e., the thermoregulatory system, was evaluated in experiments involving the determination of the error with which the average body temperature returns to its original value after exposure to superthreshold quantities of heat (60-80 cal/kg). It is found that the problem of determining the precision of PT operation is very complex and cannot be solved unambiguously. It is pointed out that the precision with which the PT strives to return the average body temperature to a certain initial value is extremely high.

B.J.

N85-22522# Air Force Geophysics Lab., Hanscom AFB, Mass.
ASTRONAUT HAZARD DURING FREE-FLIGHT POLAR EVA
 W. N. HALL *In* NASA. Lewis Research Center Spacecraft
 Environ. Interactions Technol., 1983 p 663-674 Mar. 1985
 refs

Avail: NTIS HC A99/MF E03 CSCL 06R

Extravehicular Activity (EVA) during Shuttle flights planned for the late 1980's includes several factors which together may constitute an astronaut hazard. Free-flight EVA is planned whereas prior United States Earth orbit EVA has used umbilical tethers carrying communications, coolant, and oxygen. EVA associated with missions like LANDSAT Retrieval will be in orbits through the auroral oval where charging of spacecraft may occur. The astronaut performing free flight EVA constitutes an independent spacecraft. The astronaut and the Shuttle make up a system of electrically isolated spacecraft with a wide disparity in size. Unique situations, such as the astronaut being in the wake of the Shuttle while traversing an auroral disturbance, could result in significant astronaut and Shuttle charging. Charging and subsequent arc discharge are important because they have been associated with operating upsets and even satellite failure at geosynchronous orbit. Spacecraft charging theory and experiments are examined to evaluate charging for Shuttle size spacecraft in the polar ionosphere. B.W.

N85-23294# Defence Research Information Centre, Orpington (England).

THE AUDIOMAT: AN AUTOMATIC AUDIOMETER FOR USE IN OCCUPATIONAL AUDIOMETRY

G. F. SMOORENBURG, J. L. VANRAAIJ, and A. M. MIMPEN
 Mar. 1984 50 p refs Transl. into English of rept. IZF-1983-17
 Inst. voor Zintuigfys. TNO (Netherlands), Oct. 1983
 (DRIC-T-7138; BR91771) Avail: NTIS HC A03/MF A01

The Audiomat, an audiometer for use in occupational hygiene which automatically runs an audiometric program using a microprocessor is described. The audiometric programs can be tailored to customer demands. It can be used as an independent unit or it can be linked to an ITT 2020 microcomputer. When the Audiomat is used as an independent unit, data can be read from a liquid crystal display or printed using a simple printing device. When it is linked to the microcomputer data can be stored on a diskette. Using the microcomputer, four audiometers can be controlled simultaneously and asynchronously. The four measurements can be followed simultaneously on a video display. Author (ESA)

N85-23295# Indiana Univ., Bloomington. School of Medicine.
SLEEP DEPRIVATION AND EXERCISE TOLERANCE Annual Summary Report, 1 Feb. 1982 - 31 Jan. 1983

B. J. MARTIN Jan. 1983 7 p
 (Contract DAMD17-81-C-1023; DA PROJ. 3E1-62777-A-879)
 (AD-A150180; ASR-2) Avail: NTIS HC A02/MF A01 CSCL 06S

Fifty hours of sleep loss failed to alter physiological responses to prolonged heavy exercise. At the same time it decreased significantly the ability to tolerate such exercise. These results suggest that psychological effects of sleeplessness may ultimately be most significant for subjects in exercise. GRA

N85-23296# Indiana Univ., Bloomington. School of Medicine.
SLEEP DEPRIVATION AND EXERCISE TOLERANCE Annual Report, 1 Feb. 1983 - 31 Jan. 1984

B. J. MARTIN Jan. 1984 7 p
 (Contract DAMD17-81-C-1023; DA PROJ. 3E1-62777-A-879)
 (AD-A150566; AR-3) Avail: NTIS HC A02/MF A01 CSCL 06S

Fifty hours of sleep loss failed to alter thermoregulation in severe cold stress: subjects chose identical work rates to minimize fatigue and cold sensation. Two nights of fragmented sleep worsened mood during exercise but produced no measured change in physiological responses to work or in stress hormone levels. The results suggest that sleep loss is not a true physiological stress but instead manifests itself primarily as a psychological stress. GRA

N85-23297# Indiana Univ., Bloomington. School of Medicine.
SLEEP DEPRIVATION AND EXERCISE TOLERANCE Annual Summary Report, 1 Feb. 1984 - 31 Jan. 1985

B. J. MARTIN Jan. 1985 9 p
 (Contract DAMD17-81-C-1023; DA PROJ. 3E1-62777-A-879)
 (AD-A150626; ASR-4) Avail: NTIS HC A02/MF A01 CSCL 06S

The purpose of this study is to identify the effects of sleep deprivation on the physiological and psychological responses to exercise. Standard techniques in human exercise physiology are utilized. During this year, we found that fragmenting two nights of sleep prior to heavy exercise had no effect on physiological response to that exercise. Heart rate, metabolic rate, and body temperature were identical to control, in contrast to sleepiness and mood disturbance, both of which were significantly elevated. In past work, such psychological effects were correlated with decreased exercise tolerance. Also, we found that a 36 hour sleepless period prior to prolonged mild exercise has no influence on physiological responses to that exercise, though it as well significantly elevated mood disturbance. Because neither form of sleep loss changed stress hormonal levels in subsequent exercise, we conclude that sleep loss of this form is primarily a psychological and not a physiological stress. GRA

N85-23298# Argonne National Lab., Ill. Biological and Medical Research Div.

DISTRIBUTION OF RADIUM AND PLUTONIUM IN HUMAN BONE

R. A. SCHLENKER 1984 21 p refs Presented at the 18th European Symp. on Calcified Tissue, Angers (France), 11 Oct. 1984

(Contract W-31-109-ENG-38)

(DE85-005025; CONF-8410161-3) Avail: NTIS HC A02/MF A01

This covers aspects of current and recent work on the distribution of radium and plutonium near the surfaces of human bone are presented as well as applications of the data. Methods, surface deposit thickness, radium distribution near the endosteal surface, the use of alpha spectrometry in conjunction with autoradiography, radium distribution in the mastoid, and factors affecting plutonium specific activity are considered. Emphasis is placed on the alpha spectrometry technique because of its usefulness and its recent application to problems of local dosimetry. DOE

N85-23441# Joint Publications Research Service, Arlington, Va.
ARMED FORCES SPECIAL SYMPOSIUM ON MEDICINE OF ALTITUDES

K. YUNG *In its* China Rept.: Sci. and Technol. (JPRS-CST-85-003) p 123-130 28 Jan. 1985 Transl. into ENGLISH from Jiefangjun Zazhi (Beijing), no. 4, 20 Aug. 1984 p 311-312

Avail: NTIS HC A11/MF A01

Summaries from the symposium on the medicine of altitude and the symposium on monoclonal antibodies are presented. G.L.C.

N85-24145# Joint Publications Research Service, Arlington, Va.
ADVANCES IN STUDY OF COLD INJURY IN ARMY

L. ENBO *In its* China Rept.: Sci. and Technol. (JPRS-CST-84-012) p 48-52 23 Apr. 1985 Transl. into ENGLISH from Jiefangjun Yixue Zazhi (Peking), no. 6, 20 Dec. 1983 p 469-470

Avail: NTIS HC A04/MF A01

Progress in the prevention and treatment of cold injuries is examined. Some aspects discussed are: factors for the prevalence, pathogenesis and treatment of severe cold injury; cold endurance physical training; and cold prevention and heat preservation. E.R.

N85-24426# Joint Publications Research Service, Arlington, Va.
PLANS FOR ADAPTATION RESEARCH DURING ANTARCTIC EXPEDITION Abstract Only

A. MKHITARYAN *In its* USSR Rept.: Earth Sci. (JPRS-UES-85-004) p 4 13 Mar. 1985 Transl. into ENGLISH from Sotsialisticheskaya Ind. (USSR), 31 Oct. 1984 p 4
 Avail: NTIS HC A05/MF A01

The human adaptation, working fitness forecasting in conditions of high elevations, and human physiological reserves in extreme conditions were studied. The effectiveness of conditioning to endure the oxygen-deficient conditions of Vostok station, located 4,000 meters above sea levels, was tested. Adaptogens based on natural products such as ginseng root, whose effectiveness in increasing resistance to oxygen deficiency will be evaluated. B.G.

N85-24702# Joint Publications Research Service, Arlington, Va.
INSTRUMENT FOR DETERMINING SPATIAL COORDINATION OF HAND MOVEMENTS Abstract Only

G. I. KUTSENKO, Y. I. SOSHIKOV, and B. N. MINCHIN *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-012) p 51 25 Mar. 1985 Transl. into ENGLISH from Gigiyena i Sanit. (Moscow), no. 9, Sep. 1984 p 49-51
 Avail: NTIS HC A08/MF A01

It is often necessary to estimate the status of the function of coordination of the movement of the hands as well as changes in the status of this function during the course of a working day. Existing devices intended to study this function have a number of shortcomings, particularly the ability of the test subject in each case to determine the speed at which the test task will be performed. A method is suggested for determining spatial coordination of movements of the hands utilizing a test involving closing of an electric circuit by moving the hand and an indicator in a horizontal plane intended to eliminate these shortcomings. The method is distinguished by the fact that to make diagnosis of the functional status of the motor apparatus more objective, the test subject is forced to move the indicator at a predetermined rate. Objective determination of the deterioration of coordination during the course of a working day is allowed. B.G.

N85-24704# Joint Publications Research Service, Arlington, Va.
PRINCIPAL PATTERNS OF FUNCTIONAL CHANGES OF HUMAN RESPIRATORY SYSTEM IN ADAPTATION TO HIGH PRESSURE Abstract Only

S. A. GULYAR *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-012) p 116 25 Mar. 1985 Transl. into ENGLISH from Fiz. Zh. (Kiev), v. 30, no. 6, Nov. - Dec. 1984 p 667-679
 Avail: NTIS HC A08/MF A01

Results of physiological regulation mechanisms of the transfer of respiratory gas in the human body under increased pressure in nitrogen oxygen are reported. In moderate pressures human oxygen is characterized by increased rate and intensity of O₂ intake into alveoli, elevated PO₂ in alveoli and in arterial blood but decreased rate and intensity of its transport by arterial and venous blood and lower PO₂ in the latter. The principal respiratory mechanisms show an increased physiological respiratory and dead volume, lowered alveolar ventilation in the lungs, slower diffusion of O₂ through the alveolar capillary barrier, higher unevenness of ventilation perfusion ratio in the lungs, lower capillary blood flow in lungs and higher blood shunting. In the pressure range 0.25 to 0.5 MPa the hyperbaric factors may be arranged in the following order of increasing effect: compression and temperature stress; hyperoxia; increased density, partial pressure of nitrogen and temperature of the respiratory medium; and hypodynamics. B.G.

N85-24707 Ball State Univ., Muncie, Ind.
AEROBIC AND ANAEROBIC EXERCISE TOLERANCE IN THE HEAT: EFFECT AND ACCLIMATIZATION Ph.D. Thesis

D. S. KING 1984 119 p
 Avail: Univ. Microfilms Order No. DA8429661

The effect of heat acclimatization on aerobic exercise tolerance in the heat, and on subsequent anaerobic exercise performance was investigated. Ten male subjects were acclimatized by

exercising 80 minutes per day for eight days in the heat (39.7 C db, 31.0% RH) on a bicycle ergometer at a workload corresponding to 54% of VO₂ max. Prior to and following heat acclimatization, the subjects performed six hours at intermittent, submaximal (50% VO₂ max) exercise in the heat (HET). A 45 sec maximal bicycle ride was performed before (sprint 1) and after (sprint 2) each HET. Mean (+ or - SE) resting plasma volume was higher (+9.2 + or 0 1.7%) in acclimatized subjects (ACC) compared with unacclimatized (UN) subjects (P 0.001). Muscle glycogen utilization during the HET was greater in the UN trial (57.4 + or - 5.1 mmol/kg) than the ACC trial (26.6% + or - 6.4 mmol/kg, P 0.05). No differences were noted between the UN and ACC trials with respect to blood glucose, lactate (LA), or respiratory exchange ratio during the HET. Dissert. Abstr.

N85-24708 Cincinnati Univ., Ohio.
THE EFFECT OF OCCUPATIONAL EXPOSURE AND THE BODY WEIGHT TO HEIGHT RATIO ON EXHALED METHYLENE CHLORIDE BREATH CONCENTRATION IN FEMALES AT ONE, EIGHTEEN AND SIXTY-SIX HOURS POST EXPOSURE Ph.D. Thesis

P. G. BROWN 1984 248 p
 Avail: Univ. Microfilms Order No. DA8425369

The storage of methylene chloride in the body fat reservoir offers the possibility of extended low level exposure to workers during offwork hours. The exhaled breath of female workers for methylene chloride using a cryogenic trapping technique was examined. This was correlated to exposure concentrations in the workplace. Specifically the study was designed to (1) quantitate the weekly occupational exposures using a charcoal tube sampling technique, (2) measure the cryogenically collected methylene chloride in the expired air of exposed workers at one, 18, and 66 hours post exposure, (3) measure the carboxyhemoglobin in the blood of the workers at the end of the work week, and (4) develop regression equations for predicting exhaled breath concentration of methylene chloride and blood carboxyhemoglobin as a function of methylene chloride exposure concentration and body fat. Dissert. Abstr.

N85-24709*# California Univ., San Francisco.
ALTERATIONS IN GUT TRANSPORT OF MINERALS AND IN BINDING PROTEINS DURING SIMULATED WEIGHTLESSNESS Final Technical Report, 1 Aug. 1981 - 1 Nov. 1984

D. D. BIKLE 1 Nov. 1984 13 p
 (Contract NAGW-236)
 (NASA-CR-175637; NAS 1.26:175637) Avail: NTIS HC A02/MF A01 CSDL 06S

The structural components of the skeleton develop and are maintained in a 1 g environment, shaped by the mechanical load to which they are constantly exposed. Altering such a mechanical load by reducing the gravitational force imposed on the system, as in space flight, has profound effects on the skeleton and permits an exploration of the molecular events which regulate normal skeletal homeostasis. The objective was to determine whether simulated weightlessness reduced intestinal calcium transport, and if so, to determine the molecular mechanisms for such an effect. A nonstressful tail suspension in which the rats gained weight normally while suspended was used to simulate weightlessness. A significant change in intestinal calcium transport was not demonstrated. However, a cyclic change in bone formation with suspension was shown. Based on these observations, the objective changed to determination of the hormonal regulation of bone formation during simulated weightlessness. E.A.K.

52 AEROSPACE MEDICINE

N85-24710# Army Research Inst. of Environmental Medicine, Natick, Mass.

PERIPHERAL CHANGES IN REGIONAL SWEATING RESPONSES TO EXERCISE IN HYPOBARIC ENVIRONMENTS

M. A. KOLKA, L. A. STEPHENSON, P. A. ROCK, and R. R. GONZALEZ Feb. 1985 27 p

(Contract DA PROJ. 3E1-62777-A-878)

(AD-A150757; USARIEM-M-14/85) Avail: NTIS HC A03/MF

A01 CSCL 06S

The effect of hypobaric hypoxia on the relation of regional sweating to body temperature rise was studied in four men and four women (follicular phase of menstrual cycle) who exercised 40 and 60% of their altitude specific peak aerobic power at 770 Torr (sea level), 552 Torr (2596m), and 428 Torr (4575m) in 20 C or 30 C for 35 minutes. Body temperature and sweating at the chest (C), arm (A) and thigh (T) were measured continuously from dew point sensors attached to the skin. No gender differences were found in either the sensitivity (slope) or the threshold of the sweating to body temperature for any site during any combination of exercise intensity, altitude or environmental temperature. In all experimental conditions, the mean body temperature threshold for the initiation of A (36.7 C) sweating was higher ($P < 0.05$) than C (36.5 C). The mean slopes of the sweating to body temperature relationships for the three regional sites during the exercise-temperature combinations decreased with increasing altitude. Our data indicate that there are peripheral components active in the regional sweating to body temperature relationship that occur in hypobaric hypoxia. Enhanced body cooling as a response to the higher evaporative capacity of the environment may be a component of these peripheral differences occurring in hypobaric hypoxia. GRA

N85-24711# Naval Health Research Center, San Diego, Calif.

SPARTEN (SCIENTIFIC PROGRAM OF AEROBIC AND RESISTANCE TRAINING EXERCISE IN THE NAVY): A TOTAL BODY FITNESS PROGRAM FOR HEALTH AND PHYSICAL READINESS Interim Report

E. J. MARCINIK Aug. 1984 55 p

(AD-A150869; NAVHLTHRSCHC-84-38) Avail: NTIS HC

A04/MF A01 CSCL 06N

Based on data collected from several Navy male and female populations a SPARTEN (Scientific Program of Aerobic and Resistance Training Exercise in the Navy) physical training system was developed. The comprehensive exercise format was specifically designed to enhance the health and job performance of Navy men and women. Contents include a general description of all stretching and circuit weight training exercises as well as instruction on proper breathing and weight lifting techniques. In addition, basic and advanced conditioning programs tailored for both ship and shore installations are provided. GRA

N85-24712# Naval Aerospace Medical Research Lab., Pensacola, Fla.

RESULTS OF A LONGITUDINAL STUDY OF AIRSICKNESS DURING NAVAL FLIGHT OFFICER TRAINING: EXECUTIVE SUMMARY

W. C. HIXSON, F. E. GUEDRY, JR., and J. M. LENTZ 9 Nov. 1984 10 p

(AD-A150887; SR-85-2) Avail: NTIS HC A02/MF A01 CSCL 06E

This paper is an executive summary of a series of reports describing a longitudinal study of airsickness in a large sample of Naval Flight Officers being trained to perform various nonpilot flight duties prior to fleet assignment. Airsickness data are reported on over 28,000 individual hops flown by approximately 800 students as they progressed through the Basic, Advanced, and Fleet Readiness Squadron phases of their flight training. Topics discussed include: airsickness as a function of phase of training; pipeline differences; individuals with repeated difficulties; predictive laboratory tests; attritions; use of medication; and methods of identifying students with a continuing airsickness problem. GRA

N85-24713# Naval Submarine Medical Research Lab., Groton, Conn.

THE EFFECT OF SET SIZE ON COLOR MATCHING Interim Report

S. M. LURIA, D. F. NERI, and A. R. JACOBSEN 14 Jan. 1985 29 p

(AD-A150899; NSMRL-1041) Avail: NTIS HC A03/MF A01

CSCL 06P

Current monochromatic sonar displays are soon to be replaced with chromatic ones. It is anticipated that color coding will enhance the performance of the sonar operators. A number of review articles, however, have pointed out that there are both advantages and disadvantages to the use of color coding. Used inappropriately, it may even degrade performance. The correct application of color coding depends on the nature of the task to be performed, the choice of colors, the number of colors, etc. This study sought to determine the effect of increasing the number of colors used in a color-coded CRT/display on the time required to match the colors. The time required to match a colored stimulus to one of a set of colors was measured as a function of color sets ranging in size from 2 to 10. Reaction time (RT) increased linearly with increases in set-size to five or six, after which the increase, although still linear was less steep. Mean errors increased sharply with set sizes of 9 and 10. The relative RTs to the different colors remained constant despite changes in the experimental method. GRA

N85-24714# Army Research Inst. of Environmental Medicine, Natick, Mass.

PREPARING ALBERTO SALAZAR FOR THE HEAT OF THE 1984 OLYMPIC MARATHON

L. E. ARMSTRONG, R. W. HUBBARD, B. H. JONES, and J. T. DANIELS Jan. 1985 24 p

(Contract DA PROJ. 3E1-62777-A-879)

(AD-A150942; USARIEM-M-13/85) Avail: NTIS HC A02/MF

A01 CSCL 06S

Observations were made on American marathon record holder Alberto Salazar during a climatic chamber trial, heat acclimatization training, and the 1984 Olympic Marathon. Blood samples and rectal temperature data showed that hormonal and thermoregulatory mechanisms were normal. However, measurements of a very high sweat rate (2.79 liter/hr and 3.06 liter/hr) indicated that dehydration was a potentially serious problem. In fact, Salazar lost 5.43 kg (-8.1 percent) during the Olympic marathon, in 134.3 minutes of running. Although Salazar's decreased rectal temperature was desirable, his increased sweat rate was an unnecessary physiological adaptation to training in the heat. GRA

N85-24715# School of Aerospace Medicine, Brooks AFB, Tex. MEDICAL PLANNING CRITERIA FOR IMPLEMENTATION OF CLINICAL HYPERBARIC FACILITIES Final Report, Oct. 1983 - Aug. 1984

W. T. WORKMAN, M. D. ROBINETTE, T. D. LAIRD, and F. S. CRAMER Dec. 1984 75 p

(AD-A151001; USAFSAM-TR-84-36) Avail: NTIS HC A04/MF

A01 CSCL 06L

The purpose of this technical report is three-fold. First, it provides a review of the design criteria used to determine the size of the clinical hyperbaric chamber. The upright cylinder chamber arrangement had been selected for this purpose after careful consideration of the available options. Secondly, it provides a method for determining the cost of air transportation between DoD regions which has been reviewed and validated by the Military Airlift Command Surgeon in November 1983. Thirdly, it describes a method to predict patient treatments in advance of facility availability which is crucial to facility planning. A system based on inpatient International Classification for Disease Nomenclature - 9th Edition (ICD-9) criteria has been developed and is presented in detail in the Patient Population Data paragraph. This report provides the various planning data necessary for future design and construction of clinical hyperbaric facilities in the U.S. Air Force. The concepts presented are suitable for application to DoD, VA, and civilian medical centers that are planning clinical hyperbaric facilities. GRA

N85-24716# Army Research Inst. of Environmental Medicine, Natick, Mass.

THE ENERGY COST OF WOMEN WALKING AND RUNNING IN SHOES AND BOOTS

B. H. JONES, J. J. KNAPIK, W. L. DANIELS, and M. M. TONER
12 Feb. 1985 15 p
(AD-A151022; USARIEM-M-17/85) Avail: NTIS HC A02/MF A01 CSCL 15E

The purpose of this study was to determine the difference in energy cost for women walking and running in shoes versus heavier boots. Subjects were 7 volunteers. Each subject wore both athletic shoes (avg wt = 514 + or - 50.3g) and leather military boots (avg wt = 1371 + or - 104g) at 3 walking speeds and 2 running speeds. During each walking and running trial oxygen uptake was measured. The V02 for women wearing boots were significantly higher than for shoes for both walking and running with the exception of the slowest walking speed. The average increment in energy cost was 1.0 percent per 100g increase in weight per pair of footwear. These results are similar to those reported for men from other studies which found increments in energy cost of 0.7 to 0.9 percent per 100g increase in weight of footwear.

Author (GRA)

N85-24717# Army Research Inst. of Environmental Medicine, Natick, Mass.

EXERCISE-HEAT STRAIN DURING HYPOHYDRATION: INTERACTION WITH HEAT ACCLIMATION AND AEROBIC FITNESS

M. N. SAWKA and K. B. PANDOLF 1985 29 p Presented at the 14th Commonwealth Defence Conf. Operational Clothing and Combat Equipment
(Contract DA PROJ. 3E1-62777-A-879)
(AD-A151023; USARIEM-M-15/85) Avail: NTIS HC A03/MF A01 CSCL 06S

During military operations in hot environments, the combined metabolic and environmental heat stress must be dissipated by the soldier to enable sustained physical exercise performance. The primary factors influencing a soldier's thermoregulatory responses during exercise-heat stress are acclimation state, aerobic fitness and hydration level. During physical exercise in the heat, sweat output often exceeds water intake, resulting in hypohydration, which is defined as a body water deficit. Hypohydration causes a greater heat storage and reduces physical exercise performance relative to euhydration levels. The greater heat storage is attributed to a decreased sweating rate as well as a decreased cutaneous blood flow. The greater the level of hypohydration, the greater the magnitude of cardiovascular and thermoregulatory strain and reduced physical exercise performance. Rectal temperature and heart rate responses are elevated above euhydration levels by about 0.15 C and 4 b/min for each percent decrease in body weight during exercise-heat stress, respectively. Likewise, sweating rates are decreased by about 29/sq m/h for each percent decrease in body weight. When hypohydrated, heat acclimation decreases thermoregulatory and cardiovascular strain in a comfortable environment, but only decreases cardiovascular strain in hot environments during exercise. GRA

N85-24718# Rochester Univ., N. Y. Dept. of Computer Science.

VISUAL RECOGNITION OF SIMPLE OBJECTS BY A CONNECTION NETWORK

D. C. PLAUT Aug. 1984 48 p
(Contract N00014-82-K-0193)
(AD-A151043; TR-143) Avail: NTIS HC A03/MF A01 CSCL 12A

A difficult problem in vision research is specifying how meaningful objects are recognized using the visual feature information extracted from an image. The fundamental issue involves the interaction of different levels of representation of visual information. The technical and theoretical problems that must be addressed in specifying this interaction arise in any attempt to model visual object perception. We attempt to deal with some difficult aspects of this process within the context of Feldman's

Four Frames model of visual perception. The model consists of four continually interacting representational frames, expressed in terms of a massively parallel, connectionist formalism. Within the Four Frames model, the problem of accessing object representations using visual feature information can be defined in specific computational terms. This paper presents the detailed design of a connectionist model as a possible solution to some of the major problems in the visual recognition of objects. The model proposes that an object is represented as a hierarchical structure of geometric subparts. Recognition proceeds by determining in parallel that all subparts of an object are present in the image, and then sequentially verifying that each subpart is in the proper spatial relation to the others. Implementation results demonstrate that the model can recognize any of a set of simple objects given fairly general feature input. Although the model is developed in the context of a drastically simplified visual domain, the principles it embodies are argued to adhere to many of the behavioral and biological constraints of real-world vision. GRA

N85-24719# Brookhaven National Lab., Upton, N. Y.
PHOTOREACTIVATION AND OTHER ULTRAVIOLET/VISIBLE LIGHT EFFECTS ON DNA IN HUMAN SKIN

B. M. SUTHERLAND, A. D. BLACKETT, N. I. FENG, S. E. FREEMAN, E. S. OGUT, R. W. GANGE, and J. C. SUTHERLAND 1984 13 p refs Presented at New York Acad. of Sci. Conf. on Med. and Biol. Effects of Light, N.Y., 31 Oct. 1984 Prepared in cooperation with Harvard Medical School, Boston, Mass.
(Contract DE-AC02-76CH-00016)
(DE85-005135; BNL-35477; CONF-8410211-1) Avail: NTIS HC A02/MF A01

A computer based system was devised for examining low levels (1 dimer/10(8) d) of DNA damage in human skin exposed to ultraviolet or visible radiation. The production of measurable levels of dimers was determined for light of wavelengths absorbed directly by DNA (290-320 nm). Exposure of skin to UV-A (320-380 nm) sources produced a significant numbers of endonuclease-sensitive sites. The immediate pigment darkening reaction (IPD) is tested for whether IPD protects against uv-induced dimer formation.

DOE

N85-24720# Institut Franco-Allemand de Recherches, St. Louis (France).

APPLICATION OF THE ISOENERGY PRINCIPLE AND THE A WEIGHTING TO EVALUATE LESION RISKS DUE TO NOISE IN A MILITARY ENVIRONMENT [UTILISATION DU PRINCIPE D'ISOENERGIE ET DE LA PONDERATION A POUR L'EVALUATION DES RISQUES LESIONNELS DUS A L'EXPOSITION AUX BRUITS DANS UN ENVIRONNEMENT MILITAIRE]

A. DANCER 13 Oct. 1983 10 p In FRENCH Presented at Intern. Symp. on the Effects of Noise on Hearing, Oslo, May 1982

(ISL-CO-231/83) Avail: NTIS HC A02/MF A01

A method to evaluate lesion effects of military noise to predict the risks of exposure to acoustic impulses (arms noise) for persons with and without protection devices, and to avoid the errors inherent in the utilization of the present standards which do not take into account the noise amplitude spectrum is proposed. The method is based on the isoenergy principle and on the fact that the only important quantity for the evaluation of lesion risks is the acoustic signal penetrating the cochlea. This quantity is evaluated by the A weighted curve. Author (ESA)

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

A85-31750

PERCEIVING A STABLE ENVIRONMENT

H. WALLACH (Swarthmore College, Swarthmore, PA) Scientific American (ISSN 0036-8733), vol. 252, May 1985, p. 118-124.

The results of an adaptation experiment, conducted to analyze human perception of a stable environment, are discussed. The experimental approach involved a variable-ratio transmission which connected the subject's head with either a rotatable mirror that projected an image on the screen, a rotatable shadow pattern on a circular screen enclosing the subject, or a rotatable object. Other experimental techniques included the subject tracking a projection of rows and columns of letters which moved at a given fraction of the subject's head movement speed. After a 10-min adaptation period at a displacement ratio of 0.4 the subjects failed to recognize the motion of the environment at the displacement ratio of 0.13 on the average, though responses varied greatly. L.T.

A85-31799

SPATIAL ORIENTATION: THE SPATIAL CONTROL OF BEHAVIOR IN ANIMALS AND MAN

H. SCHOENE Princeton, NJ, Princeton University Press, 1984, 365 p. Translation. refs

The forms and mechanisms of spatial orientation (SO) in animals and man are examined, summarizing the results of experimental and theoretical investigations. The fundamental principles of SO are introduced, basic concepts are defined, and the physiological processes involved are systematized. The specific mechanisms involved in visual SO; SO to heat, electric fields, and magnetic fields; chemosensory SO; SO to sound and vibration; SO to and in currents; SO by touch and feel; SO to gravity and angular acceleration; and SO without external directing cues are discussed in separate sections and illustrated with diagrams and graphs. T.K.

A85-31956*# Systems Technology, Inc., Mountain View, Calif. ASSESSMENT OF SIMULATION FIDELITY USING MEASUREMENTS OF PILOTING TECHNIQUE IN FLIGHT

S. W. FERGUSON, W. F. CLEMENT (Systems Technology, Inc., Mountain View, CA), W. B. CLEVELAND (NASA, Ames Research Center, Moffett Field, CA), and D. L. KEY (U.S. Army, Aeromechanics Laboratory, Moffett Field, CA) IN: American Helicopter Society, Annual Forum, 40th, Arlington, VA, May 16-18, 1984, Proceedings. Alexandria, VA, American Helicopter Society, 1984, p. 67-92. Army-sponsored research. refs (Contract NAS2-11098)

The U.S. Army and NASA have undertaken the systematic validation of a ground-based piloted simulator for the UH-60A helicopter. The results of previous handling quality and task performance flight tests for this helicopter have been used as a data base for evaluating the fidelity of the present simulation, which is being conducted at the NASA Ames Research Center's Vertical Motion Simulator. Such nap-of-the-earth piloting tasks as pop-up, hover turn, dash/quick stop, sidestep, dolphin, and slalom, have been investigated. It is noted that pilot simulator performance is significantly and quantifiably degraded by comparison with flight test results for the same tasks. O.C.

N85-23299*# Federation of American Societies for Experimental Biology, Bethesda, Md. Life Sciences Research Office.

RESEARCH OPPORTUNITIES IN HUMAN BEHAVIOR AND PERFORMANCES

J. M. CHRISTENSEN and J. M. TALBOT Washington NASA Apr. 1985 79 p refs (Contract NASW-3924) (NASA-CR-3886; NAS 1.26:3886) Avail: NTIS HC A05/MF A01 CSCL 051

The NASA research program in the biological and medical aspects of space flight includes investigations of human behavior and performance. The research focuses on psychological and psychophysiological responses to operational and environmental stresses and demands of spaceflight, and encompasses problems in perception, cognition, motivation, psychological stability, small group dynamics, and performance. The primary objective is to acquire the knowledge and methodology to aid in achieving high productivity and essential psychological support of space and ground crews in the Space Shuttle and space station programs. The Life Sciences Research Office (LSRO) of the Federation of American Societies for Experimental Biology reviewed its program in psychology and identified its research for future program planning to be in line with NASA's goals. B.G.

N85-23300# Council for Scientific and Industrial Research, Pretoria (South Africa). Human Development Div.

HUMAN COGNITION AND INTELLIGENCE: TOWARDS AN INTEGRATED THEORETICAL PERSPECTIVE

J. M. VERSTER Mar. 1983 120 p refs (CSIR-SR-PERS-350; ISBN-0-7988-2339-9) Avail: NTIS HC A06/MF A01

A selective review of theoretical and empirical research bearing on the nature of human cognition and intelligence is given. Developments over more than a century are traced, but disproportionate emphasis is given to the rapid advances of the past decade. A critical re-evaluation is given of early conceptions of intelligence, the first attempts at intelligence testing, and classic factor-analytic work on intellectual structure. The search for an appropriate taxonomic system of cognitive performance is examined, followed by critical commentary on comparative studies of cognitive structure and function over the life-span, across cultures, and between the sexes. Theoretical issues concerning the neurological basis of cognitive function are briefly reviewed and empirical data on the electrophysiological correlates of cognitive performance are considered. R.J.F.

N85-23301# Delaware Univ., Newark.

BRAIN MECHANISMS UNDERLYING INDIVIDUAL DIFFERENCES IN REACTION TO STRESS: AN ANIMAL MODEL Final Report, 23 Jun. 1980 - 22 Sep. 1984

J. SIEGEL and P. M. SAXTON 6 Dec. 1984 14 p (Contract DAAG29-80-K-0015) (AD-A150195; ARO-17085.3-LS) Avail: NTIS HC A02/MF A01 CSCL 06P

The cat and rat were investigated as animal models for the correlation of individual behavior with a readily obtainable electrophysiological measure, viz. augmenting/reducing of the visual evoked potential (VEP). The VEP in cats was found to be an identifiable individual signature, stable over periods of more than one year. The VEP in response to an intensity series of light flashes at a medium range of intensities was reliable over time and showed significant individual differences in response to the more intense stimuli. Some cats showed increasing VEP amplitudes to intense stimulation (augmenters), while others showed cortical inhibition, reducing the amplitude of the VEP to more intense stimuli (reducers). Augmenter cats were more exploratory and active in a behavioral chamber, and when confronted with a variety of novel and/or aversive stimuli were more reactive and responsive. This behavioral difference predicted task performance in an operant conditioning chamber. The augmenter cats were more reactive and were not as effective in exerting inhibitory control on behavior as were the reducers. Reducer cats learned a bar press inhibitory task more quickly, were less distracted by loud noise bursts and

were able to tolerate more difficult tasks than the augmenters cats. GRA

N85-23302# Yale Univ., New Haven, Conn. School of Organization and Management.

ASSESSING THE BEHAVIOR AND PERFORMANCE OF TEAMS IN ORGANIZATIONS: THE CASE OF AIR TRANSPORT CREWS Interim Report

J. R. HACKMAN and R. L. HELMREICH 15 Dec. 1984 47 p (Contract N00014-80-C-0555) (AD-A150359; SOM-WP-62; TR-5) Avail: NTIS HC A03/MF A01 CSCL 051

This report examines methodological and conceptual issues in assessing the behavior and performance effectiveness of work teams in organizations. The intent is to identify issues of general applicability by focussing in detail on problems in assessing crews that fly jet transports for scheduled airlines. Special attention is given to the historical, political, and organizational context within which assessment takes place, and to special challenges that arise when teams (rather than individuals) are assessed. GRA

N85-24721*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

USERS GUIDE: THE LARC HUMAN-OPERATOR-SIMULATOR-BASED PILOT MODEL

E. H. BOGART and M. C. WALLER Apr. 1985 47 p refs (NASA-TM-86367; NAS 1.15:86367) Avail: NTIS HC A03/MF A01 CSCL 051

A Human Operator Simulator (HOS) based pilot model has been developed for use at NASA LaRC for analysis of flight management problems. The model is currently configured to simulate piloted flight of an advanced transport airplane. The generic HOS operator and machine model was originally developed under U.S. Navy sponsorship by Analytics, Inc. and through a contract with LaRC was configured to represent a pilot flying a transport airplane. A version of the HOS program runs in batch mode on LaRC's (60-bit-word) central computer system. This document provides a guide for using the program and describes in some detail the assortment of files used during its operation.

Author

N85-24722*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FACTORS AFFECTING DWELL TIMES ON DIGITAL DISPLAYING

A. J. WILLIAMS and R. L. HARRIS, SR. Apr. 1985 35 p refs (NASA-TM-86406; NAS 1.15:86406) Avail: NTIS HC A03/MF A01 CSCL 051

A series of exploratory tests were conducted to investigate the effects of advanced display formats and display media on pilot scanning behavior using Langley's oculometer, a desktop flight simulator, a conventional electro-mechanical meter, and various digital displays. The primary task was for the test subject to maintain level flight, on a specific course heading, during moderate turbulence. A secondary task of manually controlling the readout of a display was used to examine the effects of the display format on a subject's scan behavior. Secondary task scan parameters that were evaluated were average dwell time, dwell time histograms, and number of dwells per meter change. The round dial meter demonstrated shorter dwell times and fewer dwells per meter change than the digital displays. The following factors affected digital display scanning behavior: (1) the number of digits; (2) the update rate of the digits; (3) the display media; and (4) the character font. The size of the digits used in these tests (0.28 to 0.50 inches) did not affect scan behavior measures. Author

N85-24723# Stanford Univ., Calif. Dept. of Computer Science. **PERCEPTUAL ORGANIZATION AND VISUAL RECOGNITION Ph.D. Thesis**

D. G. LOWE Sep. 1984 150 p (Contract N00039-82-C-0250; MDA903-80-C-0102; NSF DAR-78-15914)

(AD-A150826; SU-STAN-CS-84-1020) Avail: NTIS HC A07/MF A01 CSCL 05J

A computational model is presented for the visual recognition of three-dimensional objects based upon their spatial correspondence with two-dimensional features in an image. A number of components of this model are developed in further detail and implemented as computer algorithms. At the highest level, a verification process was developed which can determine exact values of viewpoint and object parameters from hypothesized matches between three-dimensional object features and two-dimensional image features. This provides a reliable quantitative procedure for evaluating the correctness of an interpretation, even in the presence of noise or occlusion. Given a reliable method for final evaluation of correspondence, the remaining components of the system are aimed at reducing the size of the search space which must be covered. Unlike many previous approaches, this recognition process does not assume that it is possible to directly derive depth information from the image. Instead, the primary descriptive component is a process of perceptual organization, which spatial relations are detected directly among two-dimensional image features. A basic requirement of the recognition process is that perceptual organization should accurately distinguish meaningful groupings from those which arise by accident of viewpoint or position. GRA

N85-24724# Brown Univ., Providence, R. I. Center for Neural Science.

A MODEL FOR GENERALIZATION AND SPECIFICATION BY SINGLE NEURONS

P. MUNRO 8 Feb. 1985 37 p (Contract N00014-81-K-0136) (AD-A150871; TR-20) Avail: NTIS HC A03/MF A01 CSCL 06P

A rule for environmentally dependent modification of the neuronal state is examined. Under the rule, the neuron selects a trigger feature that matches either a particular pattern in the stimulus set, or the most common pattern component, depending on a certain parameter. Thus a neuron may evolve to respond to its stimulus environment in one of two capacities, namely specification or generalization. Neurons of the former variety are labelled S-cells; and those of the latter, G-cells. In the model, synaptic modification is modulated by two postsynaptic mechanisms, which act antagonistically to strengthen or weaken the synaptic connectivities. The functional dependence of these mechanisms on the postsynaptic activity is shown to determine whether the neuron acts as an S-cell or a G-cell. A circuit is proposed for a module that consists of a G-cell and several S-cells sharing a common set of inputs. By inhibiting the G-cells, the S-cell acts as a contrast-enhancing element, increasing their specificities for individual patterns in the stimulus set. The output from the module is a recorded representation of the environment with respect to its general and distinctive features. GRA

N85-24725# Purdue Univ., Lafayette, Ind. Dept. of Psychological Sciences.

STEREOTYPE TRAITS CAN BE PROCESSED AUTOMATICALLY Interim Technical Report

E. R. SMITH and N. R. BRANSCOMBE Dec. 1984 44 p (Contract N00014-84-K-0288; NSF BNS-79-22366) (AD-A150947; TR-ONR-3) Avail: NTIS HC A03/MF A01 CSCL 05J

Stereotypes can theoretically influence information processing in two different ways: through passive activation of stereotype-related trait concepts in a network memory structure, or through consciously generated expectancies and inferences. A priming paradigm was adapted to investigate the role of these two processes in the case of gender and occupational stereotypes.

In two experiments, subjects pronounced trait words as rapidly as possible. The trait words were preceded by either a neutral priming word or a social group label (e.g., male or lawyer) with respect to which the traits were stereotype-consistent, inconsistent, or irrelevant. The pronunciation time was measured to index the degree of activation on the trait concept in memory, produced by the stereotyped group label. Results showed that gender stereotypes activate their associated traits automatically whereas occupational stereotypes activate related traits mainly through conscious expectancies. Practical and theoretical implications of the results are discussed, particularly with regard to the prospects for integration of social cognition and general cognitive models of memory and inference processes. Author (GRA)

N85-24726# Naval Submarine Medical Research Lab., Groton, Conn.

THE EFFECT OF SET SIZE ON COLOR RECOGNITION Interim Report

A. R. JACOBSEN and D. F. NERI 25 Jan. 1985 22 p
(AD-A150958; NSMRL-1042) Avail: NTIS HC A02/MF A01
CSCL 05J

In two separate studies a modification of Sternberg's (13) memory task was used to study the effect of the set size of colored CRT presented stimuli on time to recognition. In both, set sizes from one to seven differently colored circles (memory set) were presented for a variable period of time. Subsequently one colored circle, that had a .50 probability of belonging to the memory set, was presented and the subject responded as to whether or not he believed it belonged to the memory set. In the first study, completely different colors, were used for each set size. Some significant rises in reaction time were found as set size increased but these were definitely not linear. In a second study, successive color sets were incremented by the addition of one color. This made the sets more similar to one another and also created a condition of over-learning for the sets. The results showed no significant differences among the set sizes from two to seven colors. Hence, it appears that for color sets that are fairly well learned, there is no significant effect of set size on time to recognition, at least for set sizes up to seven elements.

Author (GRA)

N85-24727# Illinois Univ., Urbana. Engineering-Psychology Research Lab.

THE EFFECT OF STRATEGY IN SECOND ORDER MANUAL CONTROL ON RESOURCE COMPETITION WITH A STERNBERG MEMORY SEARCH TASK

B. P. GOETTLE and C. D. WICKENS Mar. 1984 41 p
(Contract N00014-79-C-0658)
(AD-A150985; EPL-84-3/ONR-84-2) Avail: NTIS HC A03/MF
A01 CSCL 05J

This study examines the effects of two different strategies of second order manual control performance on dual-task interference using the multiple resources framework. A response-strategy involves discrete time-optimal double impulse control based on momentary error. A perceptual strategy involves continuous control based upon momentary error velocity. Subjects can obtain equal levels of single task performance on both tasks. Each strategy is then time-shared with a Sternberg Memory Search task, which uses either spatial or visual material and is displayed either auditorily or visually. Two different biases of resource allocation between the two tasks are also included. An additional manipulation was task emphasis. In different conditions subjects are requested to emphasize tracking on the Sternberg task. The results indicated that performance using the response strategy showed a greater effect of changes in the Sternberg task code and modality than did performance using the perceptual strategy. Benefits in dual-task performance were realized with the auditory display when in double impulse, but not the continuous strategy, was employed. GRA

N85-24728# Johns Hopkins Univ., Baltimore, Md. Dept. of Psychiatry.

ANALYSIS OF TEAM PERFORMANCE IN A PROGRAMMED ENVIRONMENT Final Report

H. H. EMURIAN 11 Feb. 1985 18 p
(Contract NGR-21-001-111; N00014-80-C-0467)
(NASA-CR-175634; NAS 1.26:175634; AD-A150991; TR-ONR-11)
Avail: NTIS HC A02/MF A01 CSCL 05J

A research project was undertaken to investigate performance effectiveness within the context of a laboratory environment in which both interpersonal and work behaviors can be continuously monitored and evaluated over extended time periods (e.g., days). The project did not attempt to simulate a specific operational environment. Rather, the laboratory facility was designed to address a broad range of performance problems from the perspective of a functional analysis of performance effectiveness. It is essentially a programmed environment with design features and measurement capabilities that permit the accurate assessment of relationships between antecedent conditions (e.g., incentive schedules, membership turnover, etc.), and performance effectiveness. This report summarizes fourteen residential studies devoted to analyses of incentive schedules and team turbulence on individual and small-group performance in a continuously programmed environment. During the contract period, a Team Multiple Task Performance Battery (TMTPB) was developed that required a coordinated response among members of three-person teams.

GRA

N85-24729# Purdue Univ., Indianapolis, Ind.

PERCEIVED HETEROGENEITY AND ITS EFFECT ON VARIOUS TYPES OF TASKS Final Report

R. ADAMS-TEREM, J. FROSS, D. LANDIS, and R. HAYLES 1 Feb. 1985 35 p
(Contract N00014-83-K-0021)
(AD-A151003; REPT-85-1-ONR) Avail: NTIS HC A03/MF A01
CSCL 05J

This study investigated the effects of group composition and evaluation instructions on a motor task, a creative-cognitive task and a cognitive decision-making task. An anonymous group technique was used to control for extraneous variables that are frequently present in small group studies. The subjects were 48 females from undergraduate courses at the University of Hawaii. A 2 x 4 (composition X instruction) ANOVA was computed performance on each task. A significant main effect for group, showing improvement under perceived heterogeneous affiliation, was found using the creative cognitive dependent variable ($p < .05$). Significant group x instruction interactions were found for the cognitive decision-making task (p less than .02) and the motor task (p less than .04). These findings are addressed in terms of factors inherent in the composition of the groups and nature of the tasks. Implications for future research are outlined and discussed. GRA

N85-24730# Michigan Univ., Ann Arbor.

THE ROLE OF PRIOR KNOWLEDGE IN OPERATING EQUIPMENT FROM WRITTEN INSTRUCTIONS Final Report, 1 Sep. 1981 - 28 Feb. 1985

D. E. KIERAS 20 Feb. 1985 45 p
(Contract N00014-84-K-0731; DA PROJ. RR0-4206)
(AD-A151007; FR-85/ONR-19) Avail: NTIS HC A03/MF A01
CSCL 05J

This report summarizes a set of results on the role of prior knowledge in how people operate electronic equipment from written instructions. These results cover two situations: In the first, the prior knowledge is possessed by subjects prior to the experiment. These studies involved comprehension and memory of technical text, expertise in descriptions of familiar and unfamiliar pieces of equipment, and expertise effects in following instructions that differ in organization. In the second situation, the prior knowledge was provided as a part of the training involved in the experiments. These studies concerned the role of knowledge of how a system works, and transfer procedures. Simulation models were constructed and compared in detail to the data, yielding significant

theoretical conclusions about the mechanisms involved in the effective use of prior knowledge. The work has considerable practical significance for equipment training and maintenance.

GRA

N85-24731# Bernard Baruch Coll., New York. Psychophysiology Lab.

PSYCHOPHYSIOLOGICAL STUDIES. 1: PERFORMANCE AND PHYSIOLOGICAL RESPONSE IN LEARNING, SHORT-TERM MEMORY AND DISCRIMINATION TASKS Annual Report, 1 Oct. 1983 - 30 Sep. 1984

J. L. ANDREASSI and N. M. JUSZCZAK 30 Nov. 1984 91 p
(Contract AF-AFOSR-0304-83)
(AD-A151018; AFOSR-85-0070TR; AR-1) Avail: NTIS HC A05/MF A01 CSCL 05J

The report details the background, findings and conclusions of three studies completed in the Psychophysiology Laboratory of Baruch College, City University of New York, over the past twelve months. The first experiment was concerned with the effects of varied frequency of light stimulation upon verbal learning and a number of physiological responses, including: heart rate (HR), electromyogram (EMG), pulse wave velocity (PWV) and skin temperature (ST). The main findings were that HR was sensitive to task difficulty, while EMG was affected by frequency of light stimulation. Another finding was that lower baseline HR was related to better learning performance. The second study examined the effects of intensity of light stimulation on performance in a short term memory task (Sternberg paradigm) and a variety of physiological measures, including the event-related brain potential (ERP), HR, EMG, PWV, and ST. The major findings were that the endogenous component of the ERP (the P3 response) was delayed in latency with increased memory set size under the condition of no light stimulation. In the third study, we focused upon an examination of possible differences between the left and right hemispheres of the brain in processing verbal (words) versus spatial (areal size estimation) materials.

GRA

N85-24732# Michigan Univ., Ann Arbor.

THE ACQUISITION OF PROCEDURES FROM TEXT. A PRODUCTION-SYSTEM ANALYSIS OF TRANSFER OF TRAINING

D. E. KIERAS and S. BOVAIR 29 Jan. 1985 40 p
(Contract N00014-84-K-0731)
(AD-A151029; TR-85; ONR-TR-16) Avail: NTIS HC A03/MF A01 CSCL 05I

The current theory of cognitive skill describes knowledge of procedures in terms of a production rule representation which is constructed on the basis of an initial declarative (propositional) representation. In these terms, learning a procedure from written instructions consists of converting the propositional content of the written material into production rules. This process was studied in a transfer of training experiment. Subjects learned from step-to-step instructions a series of related procedures for operating a simple device, with the major manipulation being the order of learning the procedures. Very strong transfer effects were obtained, which could be predicted very well by a simple model of transfer. Individual production rules can be transferred, or re-used in the representation of a procedure if they appeared in a previously learned procedure, meaning that learning time is mostly a function of the number of completely new production rules that must be acquired. Examination of the time required to read individual instruction steps suggests, however, that this transfer mechanism involves processes acting on declarative propositional representatives of the production rules. This means that the transfer process is more similar to comprehension processes rather than conventional practice mechanisms, or Anderson's (1982) learning principles.

Author (GRA)

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

A85-30424

EVALUATION OF OLEFIN ANTI-EXPOSURE LINERS FOR THEIR EFFECTS ON THE OPERATIONAL PERFORMANCE AND SURVIVAL OF NAVAL AIRCREWMEN

S. M. REEPS and J. W. KAUFMAN (U.S. Naval Air Development Center, Aircraft and Crew Systems Technology Directorate, Warminster, PA) SAFE Journal, vol. 15, Spring 1985, p. 22-28.

Olefin anti-exposure liners, worn as part of a constant wear anti-exposure assembly, have been evaluated at the Naval Air Development Center to determine their levels of performance in the areas of mobility/reach, heat stress/comfort, and immersion hypothermia protection. Mobility/reach measurements were made using an anthropometric measuring device specifically constructed to measure movements required of aircrewmembers operating aircraft. Heat stress testing consisted of three hour exposures in 35 C air while subjects repeated a 20-minute cycle of work, psychomotor tracking, and rest. Immersion hypothermia testing was conducted in 7.2 C water, 0 C air, and 24-32 kph winds, with maximum exposure time set at two hours. Two liner configurations, differing in the extent of body-extremity coverage, were evaluated and compared to the current CWU-23/P Anti-exposure liner. Both configurations are fabricated of 100 percent olefin-microfiber insulation sandwiched between layers of woven high-temperature resistant aramid fabric for fire protection. The results are discussed in terms of the U.S. Navy Operational Requirement for cold water protection, as currently specified by CNO. A review of related evaluations conducted at other facilities is also provided and discussed.

Author

A85-30628

DYNAMIC CHARACTERISTICS OF SYSTEMS OF PRELIMINARY SPATIAL IMAGE PROCESSING [DINAMICHESKIE KHARAKTERISTIKI SISTEM PREDVARITEL'NOI PROSTRANSTVENNOI OBRABOTKI IZOBRAZHENII]

V. A. VLASENKO and V. N. KRYLOV Radioelektronika (ISSN 0021-3470), vol. 28, March 1985, p. 18-21. In Russian. refs

A Volterra-Wiener series approach is used to analyze the dynamic characteristics of simplified models of systems for the preliminary spatial processing of achromatic and color images. Machine experiments have demonstrated that the proposed method is adequate for describing the responses of an actual human visual analyzer.

B.J.

A85-30944

FLYING WITH NIGHT-GOGGLES AND HEAD-DOWN DISPLAY AT NIGHT

E. DANNEBERG (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugfuehrung, Brunswick, West Germany) (European Rotorcraft and Powered Lift Aircraft Forum, 9th, Stresa, Italy, Sept. 13-15, 1983) Vertica (ISSN 0360-5450), vol. 8, no. 4, 1984, p. 423-431. refs

The results of an optimization study of the components and systems suitable for efficient operation of the helicopter crew in low-level flights at night are outlined. The systems discussed are: electronic head-down display, helmet-mounted display, night goggles, low light level TV, and forward-looking IR cameras. Pilot's eye movements were recorded during flights over an obstacle and over familiar and unfamiliar routes; the responses indicate the desirability of integrating the head-down display in the lower part of the instrumental panel. Moreover, it is inferred that during flights over an unfamiliar route it is beneficial for the pilot to concentrate on the aircraft control while the copilot is concerned with navigation.

L.T.

A85-32595#

AIRPLANE DESIGNER'S CHECKLIST FOR OCCUPANT INJURY PREVENTION

H. W. SMITH (Kansas, University, Lawrence, KS) Journal of Aircraft (ISSN 0021-8669), vol. 22, May 1985, p. 444-447. Previously cited in issue 03, p. 99, Accession no. A85-13583. refs

A85-32763

MEDICAL MONITORING OF THE MICROCLIMATE OF SHIP COMPARTMENTS [MEDITSINSKII KONTROL' ZA MIKROKLIMATOM KORABEL'NYKH POMESHCHENII]

E. A. BUKHARIN, N. T. SVISTUNOV, and L. G. TEPINA Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Jan. 1985, p. 55-57. In Russian.

N85-22404# Joint Publications Research Service, Arlington, Va. TASS UPDATE ON UNMANNED FLIGHT OF SALLYUT-7

In its USSR Rept.: Space (JPRS-USP-85-001) p 3-10 4 Feb. 1985 Transl. into ENGLISH from Izvestiya (USSR), 20 Dec. 1984 p 1

Avail: NTIS HC A07

The relationships between man and automation in space are examined. The advantages and disadvantages of all automation, all human control, and a man machine interplay are discussed. Also considered were spacecraft control modes; automation in the first space flights; work on orbital complexed; and the flight control center. B.G.

N85-22780# Joint Publications Research Service, Arlington, Va. STUDY OF EFFECTIVE PHYSIOLOGICAL TEMPERATURE Abstract Only

P. CHENG and J. WEIQING In its China Rept: Sci. and Technol. (JPRS-CST-84-030) p 43 10 Oct. 1984 refs Transl. into ENGLISH from Yuhang Xuebao (Beijing, China), no. 2, 30 Apr. 1984 p 10-15

Avail: NTIS HC A03/MF A01

The effect of temperature, humidity, and wind speed on the human body was studied under a variety of conditions. Experiments were conducted with 161 young men wearing 0.5C10 clothing in a high temperature cabin where microclimatic factors could be controlled in the following ranges: temperature 40-60 C, relative humidity 25-75 percent, wind speed 0.25-1.00 m/sec. The rates and magnitudes of changes in body temperature, heart beat rate, and perspiration were determined. It was discovered that each microclimatic factor does not affect the body independently. Instead, it is always related to other factors. The effect of wind speed is affected by temperature and humidity. When the temperature is higher than the body temperature, the wind speed has a heating effect due to convection. Otherwise, it has a cooling effect. When the ambient humidity is high, the heat dissipation effect is insignificant. In low humidity, the heat dissipation effect might cancel the convection heating effect at high temperatures. A mathematical expression was obtained based on the high temperature endurance data measured with 24 combinations of microclimatic factors. B.W.

N85-23303# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.**TIGHT RIBBON ARM PROTECTION (TRAP) FOR AIRCREWMAN EJECTION**

D. LORCH and M. SCHULTZ Jul. 1984 27 p (Contract W05-84)

(AD-A150464; NADC-84115-60) Avail: NTIS HC A03/MF A01 CSCL 01C

When an aircrewman ejects at high speed from a damaged aircraft the windblast (high Q force) can cause arm fractures and dislocations. These injuries may be so severe that he is unable to help himself survive after the parachute descent. The TRAP (TIGHT RIBBON ARM PROTECTION) was designed to provide ejection seat arm restraint; it consists of two nylon ribbons sewn onto either side of the crewman's parachute harness (either seat-mounted or torso harness mounted). Each of these pulls down off the crewman's shoulder and automatically tightens over his

arm as the ejection seat moves up into the air stream. The crewman hooks up the TRAP to snubber lines as he connects into the aircraft restraint. Initial tests indicate that the TRAP system may be able to solve the arm restraint problem. GRA

N85-23304# Royal Aircraft Establishment, Farnborough (England). Protective Equipment Section.**THE APPLICATION OF ANTHROPOMETRIC SURVEY DATA TO AIRCREW CLOTHING SIZING**

J. E. APLIN May 1984 29 p

(AD-A150545; RAE-TR-84050; DRIC-BR-93752) Avail: NTIS HC A03/MF A01 CSCL 06N

Since completion of the 1970/71 anthropometric survey of 2000 Royal Air Force aircrew, the Protective Equipment Section of Flight Systems (Farnborough) Department has made full use of the acquired data to support its advisory role on aircrew protective clothing sizing. Computer analysis of the data has been undertaken to provide sizing information relevant to a variety of garment types and numerically different size-rolls. This Report outlines the general approach adopted for the sizing of body-cover garments and headgear. The influences of the choice of control dimensions and subsidiary measurement range limitation upon the size-rolls for aircrew one-piece overall type garments are discussed. GRA

N85-24040# Joint Publications Research Service, Arlington, Va. CONTROLLABLE MOVEMENTS OF ELASTIC MANIPULATOR WITH THREE DEGREES OF FREEDOM Abstract Only

A. A. GUKASYAN In its USSR Rept.: Eng. and Equipment (JPRS-UEQ-84-001) p 19 9 Feb. 1984 Transl. into ENGLISH from Izv. Akad. Nauk Arm. SSR: Mekhan. (Yerevan), v. 36, no. 3, Mar. 1983 p 12-20

Avail: NTIS HC A06

The kinematics and the dynamics of a programmable automatic manipulator are analyzed, allowing for elastic compliance of its single link and regarding a perfectly stiff one as a limiting case only. A manipulator with three degrees of freedom is considered, one to which the linear theory of thin straight beams is applicable. The equations of equilibrium for such a manipulator carrying a load are derived in generalized Lagrange coordinates from corresponding expressions for kinetic energy and potential energy. For deriving the equation of kinematic control, the manipulator is assumed to be driven by three motors according to prescribed laws of motion in terms of the three generalized coordinates as functions of time. For deriving the equation of dynamic control, the manipulator is assumed to be driven by three motors in accordance with prescribed laws governing the two forces and one moment as functions of the three generalized coordinates and time. The analysis concludes with control of the two forces and one moment on the manipulator link for a prescribed motion of the load. Author

N85-24698# Joint Publications Research Service, Arlington, Va. COMPLEX PROGRAM OF ERGONOMIC STUDIES PILOT DESCRIBED

A. POTAPENKO In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-012) p 1-2 25 Mar. 1985 Transl. into ENGLISH from Nedelya (Moscow), 3-9 Dec. 1984 p 4

Avail: NTIS HC A08/MF A01

The complex program of ergonomics, Pilot, is used to help physicians in observing the state of health of the pilot from the moment he decides to become a pilot to the day he leaves civil aviation. In practice, it is a system which performs professional selection of candidates for the flying profession, evaluates the habits of the pilot in flight training; perform the preflight control of the crew; monitors the condition of the pilot in the air; and stores all necessary information. B.G.

N85-24733*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

FOOD SERVICE AND NUTRITION FOR THE SPACE STATION
R. L. SAUER, ed. Apr. 1985 99 p refs Workshop held in Houston, Tex., 10-11 Apr. 1984
(NASA-CP-2370; S-541; NAS 1.55:2370) Avail: NTIS HC A05/MF A01 CSCL 06H

The proceedings of the Workshop on Food Service and Nutrition for the Space Station, held in Houston, Texas, on April 10 and 11, 1984 was given. The workshop was attended by experts in food technology from industry, government, and academia. Following a general definition of unique space flight requirements, oral presentations were made on state of the art food technology with the objective of using this technology to support the space flight requirements. Numerous areas are identified which in the opinion of the conferees, would have space flight application. But additional effort, evaluation, or testing to include Shuttle inflight testing will be required for the technology to be applied to the Space Station.

N85-24734*# Little (Arthur D.), Inc., Cambridge, Mass.

THE CONTEXT FOR FOOD SERVICE AND NUTRITION IN THE SPACE STATION
P. E. GLASER In NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 4-11 Apr. 1985 refs
Avail: NTIS HC A05/MF A01 CSCL 06H

Commercial activities in space represent diverse markets where international competitors will be motivated by economic, technical and political considerations. These considerations are given and discussed. The space station program, industrial participation and the potential benefits of commercial activities in space are described. How food service and nutrition affects habitability, effects on physical condition, dietary goals, food preparation and meal service are detailed. E.R.

N85-24735*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

NASA PLANS FOR A SPACE STATION
C. COVINGTON In its Food Serv. and Nutr. for the Space Shuttle p 12-15 Apr. 1985
Avail: NTIS HC A05/MF A01 CSCL 06H

The rationale for developing a space station is discussed. It is envisioned as a multipurpose facility which can serve a wide range of scientific and technology development activities. Alternative approaches to the space station are also considered. Planning and engineering guidelines are developed. The commercialization of the space station is outlined. E.R.

N85-24736*# Hilton (Conrad N.) Coll. of Hotel and Restaurant Management, Houston, Tex.

FOOD SERVICE MANAGEMENT
C. L. RAPPOLE and S. A. LOUIER (Houston Univ.) In NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 16-19 Apr. 1985
Avail: NTIS HC A05/MF A01 CSCL 06H

A study to design a food service system using current technology to design a small scale Space Station was conducted. The psychological, sociological and nutritional factors affecting feeding in microgravity conditions was investigated. The logistics of the food service system was defined. E.R.

N85-24737*# Little (Arthur D.), Inc., Cambridge, Mass.

FOOD ACQUISITION: FOOD INGREDIENTS, RAW MATERIALS AND SUPPLY
D. W. WHEAT In NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 20-22 Apr. 1984
Avail: NTIS HC A05/MF A01 CSCL 06H

The kind of food supply system that will serve the space station in coming years is considered. The direction and rate of evolution of space food service systems is also considered and what is needed to supply appropriate food to space station crews. Innovations in food sourcing, recipe development, pre-preparation,

packaging, preservation, presentation, consumption and waste disposal are discussed. The development and validation of preparation systems and ingredients which minimize demands on crew time and provide maximum eating enjoyment is outlined. E.R.

N85-24738*# Brigham Young Univ., Provo, Utah. Dept. of Food Science and Nutrition.

PREPARATION METHODS: PAST AND POTENTIAL METHODS OF FOOD PREPARATION FOR SPACE
C. S. HUBER In NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 23-29 Apr. 1985
Avail: NTIS HC A05/MF A01 CSCL 06H

The logical progression of development of space food systems during the Mercury, Gemini, Apollo, Skylab and Shuttle programs is outlined. The preparation methods which include no preparation to heating, cooling and freezing are reviewed. The introduction of some new and exciting technological advances is proposed, which should result in a system providing crew members with appetizing, safe, nutritious and convenient food. E.R.

N85-24739*# Little (Arthur D.), Inc., Cambridge, Mass.

ALTERNATIVE FOOD PRESERVATION TECHNIQUES, NEW TECHNOLOGY IN FOOD PREPARATION AND APPROPRIATENESS OF FOOD SUPPLY FOR THE PERMANENTLY MANNED SPACE STATION
R. H. WHELAN In NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 30-32 Apr. 1985
Avail: NTIS HC A05/MF A01 CSCL 06H

Alternative food preservation techniques are defined as unique processes and combinations of currently used processes for food preservation. Food preservation is the extension of the useful shelf-life of normally perishable foods (from harvest to final consumption) by controlling micro-organisms, enzymes, chemical changes, changes in sensory characteristics and the prevention of subsequent recontamination. The resulting products must comply with all applicable food manufacturing practice regulations and be safe. Most of the foods currently used in both space and military feeding are stabilized either by dehydration or the use of a terminal sterilization process. Other available options would be formulation to reduce water activity, the refrigeration and freezing of perishable foods, chemical addition, and physical treatment (ionizing or nonionizing radiation or mechanical action). These alternatives are considered and proposals made. Author

N85-24740*# Army Natick Research and Development Command, Mass. Science and Advanced Technology Lab.

USE OF IRRADIATED FOODS
A. BRYNJOLFSSON In NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 33-35 Apr. 1985
Avail: NTIS HC A05/MF A01 CSCL 06H

The safety of irradiated foods is reviewed. Guidelines and regulations for processing irradiated foods are considered. The radiolytic products formed in food when it is irradiated and its wholesomeness is discussed. It is concluded that food irradiation processing is not a panacea for all problems in food processing but when properly used will serve the space station well. E.R.

N85-24741*# Enersyst, Inc., Dallas, Tex.

EQUIPMENT FOR HOT-TO-SERVE FOODS
D. P. SMITH In NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 36-46 Apr. 1985
Avail: NTIS HC A05/MF A01 CSCL 06H

Patented surface heating devices with a much faster air-to-solid heat transfer rate than previous air ovens were developed. The accelerated surface heating can brown, sear or crisp much more rapidly than in conventional ovens so that partially prepared food can be finished quickly and tastefully immediately before serving. The crisp, freshly browned surfaces result from the faster heat transfer which does not dry out the food. The devices are then compared to convection ovens and microwave heating processes. B.G.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

N85-24742*# Department of the Army, Washington, D. C.
NUTRITIONAL CRITERIA FOR MILITARY RATIONS AND EFFECTS OF PROLONGED FEEDING ON ACCEPTABILITY
D. SCHNAKENBERG *In* NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 47-48 Apr. 1985

Avail: NTIS HC A05/MF A01 CSCL 06H

Broad nutritional policies for operational rations are designed to insure that the nutritional content of the rations served will sustain combat effectiveness. Concern exists that these rations, although nutritionally complete, would become monotonous because of limited variety causing nutrient intake to decrease and body weight losses to occur with adverse effects on morale and combat effectiveness. Whenever possible, troops are now fed one or two hot meals per day containing fresh foods and a much greater variety of foods than are available in packaged rations. A laboratory test was conducted with student volunteers and the results are discussed. B.G.

N85-24743*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

NUTRITION IN SPACE FLIGHT: SOME THOUGHTS

P. C. JOHNSON, JR. *In its* Food Serv. and Nutr. for the Space Shuttle p 49-52 Apr. 1985

Avail: NTIS HC A05/MF A01 CSCL 06H

Space flight causes physiological changes related to microgravity and on which nutrition has a bearing. Examples are: muscle atrophy-protein; bone atrophy-calcium; phosphorus, and vitamin D; space sickness-fat; cardiovascular deconditioning-sodium; water, and potassium. The physiological changes are discussed which relate to living in space. B.G.

N85-24744*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

FOOD SERVICE AND NUTRITIONAL NEEDS

J. KERWIN *In its* Food Serv. and Nutr. for the Space Shuttle p 53-55 Apr. 1985

Avail: NTIS HC A05/MF A01 CSCL 06H

The difficulty is that as we go into the Space Station world, the cost, effort, hardware, food trash, and food waste that the food service system will generate (which is quite tolerable on a 7 day mission), probably will be intolerable on a 90 day Space Station mission. The challenge in the food service supply is not so much packaging but systems engineering. The big constraints are in the supply pipeline. Those constraints and the possible tradeoffs are discussed. B.G.

N85-24745*# Little (Arthur D.), Inc., Cambridge, Mass.

PSYCHOBIOLOGY AND FOOD PERCEPTION

A. NEILSON *In* NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 56-58 Apr. 1985

Avail: NTIS HC A05/MF A01 CSCL 06H

Psychobiology is a scientific discipline which encompasses the phenomena known to be important as regards nutrition and food consumption in space. Specifically, it includes those areas of biology which are clearly related to behavior, human subjective experience and problems of coping and adapting to stress. Taste and odor perception; perception (knowledge gaps); perception (needs); food preference and menu selection; and choosing of acceptable diets are discussed. B.G.

N85-24746*# Signode Corp., Glenview, Ill. Corporate Planning and Development Dept.

PACKAGING'S CONTRIBUTION FOR THE EFFECTIVENESS OF THE SPACE STATION'S FOOD SERVICE OPERATION

B. A. RAUSCH *In* NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 59-62 Apr. 1985
Avail: NTIS HC A05/MF A01 CSCL 06H

Storage limitations will have a major effect on space station food service. For example: foods with low bulk density such as ice cream, bread, cake, standard type potato chips and other low density snacks, flaked cereals, etc., will exacerbate the problem of space limitations; package containers are inherently volume

consuming and refuse creating; and the useful observation that the optimum package is no package at all leads to the tentative conclusion that the least amount of packaging per unit of food, consistent with storage, aesthetics, preservation, cleanliness, cost and disposal criteria, is the most practical food package for the space station. A series of trade offs may have to be made to arrive at the most appropriate package design for a particular type of food taking all the criteria into account. Some of these trade offs are: single serve vs. bulk; conventional oven vs. microwave oven; nonmetallic aseptically vs. non-aseptically packaged foods; and comparison of aseptic vs. nonaseptic food packages. The advantages and disadvantages are discussed.

B.G.

N85-24747*# Little (Arthur D.), Inc., Cambridge, Mass.

PACKAGING FOR FOOD SERVICE

E. J. STILWELL *In* NASA. Lyndon B. Johnson Space Center Food Serv. and Nutr. for the Space Shuttle p 63-66 Apr. 1985

Avail: NTIS HC A05/MF A01 CSCL 06H

Most of the key areas of concern in packaging the three principle food forms for the space station were covered. It can be generally concluded that there are no significant voids in packaging materials availability or in current packaging technology. However, it must also be concluded that the process by which packaging decisions are made for the space station feeding program will be very synergistic. Packaging selection will depend heavily on the preparation mechanics, the preferred presentation and the achievable disposal systems. It will be important that packaging be considered as an integral part of each decision as these systems are developed. B.G.

N85-24748*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

SHUTTLE OPERATIONAL TEST AND SCIENTIFIC INVESTIGATIONS

J. C. STONESIFER *In its* Food Serv. and Nutr. for the Space Shuttle p 67-73 Apr. 1985

Avail: NTIS HC A05/MF A01 CSCL 06H

The Detailed Test Objectives (DTOs) originated as a test or measurement made to verify the function of a vehicle system for certification of a vehicle system. The Detailed Supplementary Objectives (DSOs) are a demonstration or test which has a lower priority than a DTO. The criteria for inclusion on space shuttle mission is discussed. B.G.

N85-24749*# Computer Sciences Corp., Silver Spring, Md.

PROGRAMMER/ANALYST WORKSTATION EVALUATION REPORT

R. MITAL Nov. 1984 103 p refs Presented at 1st Intern. Conf. on Computer Workstations, San Jose, Calif., 11-14 Nov. 1985

(Contract NAS5-27888)

(NASA-CR-175289; NAS 1.26:175289; CSC/TM-84/6138) Avail: NTIS HC A06/MF A01 CSCL 05H

The methodology and results of the programmer/analyst workstation evaluation undertaken at Computer Sciences Corporation under task assignment 80200 is presented. E.A.K.

N85-24750# Naval Aerospace Medical Research Lab., Pensacola, Fla.

DUAL-TASK TIMESHARING USING A PROJECTED ATTITUDE DISPLAY (MALCOLM HORIZON)

A. H. BELLENKES Nov. 1984 17 p

(Contract M00-96)

(AD-A150789; NAMRL-1310) Avail: NTIS HC A02/MF A01 CSCL 01D

In order to optimize timesharing and facilitate performance in the high workload environment of the modern cockpit, a peripheral vision horizon device (PVHD) has been developed which can present aircraft attitude data to the visual periphery; an area reported to be highly sensitive to the perception of information regarding orientation in space. A great deal of subjective evidence gathered from simulator and operational test flights has lent support

PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

A85-32165

WEAK NEUTRAL CURRENTS AND THE ORIGIN OF BIOMOLECULAR CHIRALITY

D. K. KONDEPUDI and G. W. NELSON (Texas, University, Austin, TX) *Nature* (ISSN 0028-0836), vol. 314, April 4, 1985, p. 438-441. Research supported by the Robert A. Welch Foundation and International Paper Co. refs (Contract DE-AS05-81ER-10947)

A simple and extremely sensitive mechanism is demonstrated by which a minute but systematic chiral interaction, no stronger than the weak neutral currents interaction in amino acids, can, over a period of about 15,000 yr, determine which enantiomer will dominate the earth's biochemistry. The mechanism is an extension of Frank's (1953) homogeneous chemical kinetic mechanism for an open-flow reactor system and incorporates a recently evaluated internal bias. C.D.

A85-32977

QUANTITATIVE POLYPHOSPHATE-INDUCED 'PREBIOTIC' PEPTIDE FORMATION IN H₂O BY ADDITION OF CERTAIN AZOLES AND IONS

J. RABINOWITZ (Geneve, Universite, Geneva, Switzerland) and A. HAMPAL (Geneva, University Hospital, Geneva, Switzerland) *Journal of Molecular Evolution* (ISSN 0022-2844), vol. 21, no. 2, 1984-1985, p. 199-201. refs

The first quantitative condensation of an alpha-amino acid into diglycine, triglycine and smaller amounts of higher peptides has been achieved in 14 days at room temperature and pH of 9.5-10.5. The amino acid was in aqueous solution with M trimetaphosphate in the presence of imidazole and 1,2,4-triazole. Peptide yields were highest when pH was adjusted with concentrated NaOH and KOH instead of ammonia. A complete list of the obtained peptides is provided. I.H.

to the efficacy of this device in improving performance. However, this capability has yet to be verified by controlled laboratory testing. Two horizon sizes were evaluated; one with dimensions similar to that found in an aircraft instrument panel and the other extending out to the visual periphery. The objective of this study was to determine whether dual-task performance could be improved by using the large projected horizon vs. a more conventional short horizon. The findings indicated that the PVHD allowed subjects to perform the foveated mental arithmetic task while simultaneously controlling the orientation of the horizon. PVHD root mean square (RMS) error, and mental arithmetic speed/accuracy data were found to be superior when subjects used the extended vs. the short horizon for tracking. These findings suggest that the PVHD permitted individuals to process the two sets of visual information in parallel, thereby improving performance on both. (Author).

GRA

N85-24751# Army Tropic Test Center APO, Miami 34004.

STREAMLINED TEST REPORTING AND PLANNING (STRAP): COMPUTERIZED HUMAN FACTORS QUESTIONNAIRE Methodology Investigation Report, Jun. - Sep. 1984

L. S. HAY Sep. 1984 28 p

(AD-A150811; USATTC-840905) Avail: NTIS HC A03/MF A01 CSCL 05B

A computerized program for preparing questionnaires is presented. The computer operator enters the form title and lists of questions which are stored under a unique file name. He later assembles the questionnaire by entering the question variable number and using the appropriate special function key. The final product is letter quality ready for insertion into the test plan. The methodology investigation proposal (MIP) is provided. Work on the computer aided reporting system; the test status information program; and the reliability, availability and maintainability data collection system called for in the MIP will be deferred so that those efforts will fit better into the overall US Army Test and Evaluation Command (TECOM) effort for automating test plans and reports. GRA

N85-24752# Army Research Inst. of Environmental Medicine, Natick, Mass.

CURRENT APPROACHES FOR THE BIOPHYSICAL AND PHYSIOLOGICAL EVALUATION OF COMBAT CLOTHING FOR ENVIRONMENTAL EXTREMES

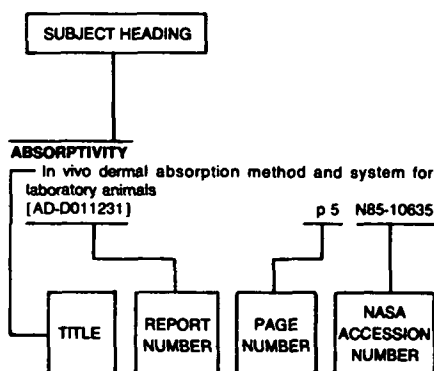
K. B. PANDOLF, R. R. GONZALEZ, and M. N. SAWKA Feb. 1985 17 p Presented at the 14th Commonwealth Defence Conf. on Operational Clothing and Combat Equipment

(Contract DA PROJ. 3E1-62777-A-878)

(AD-A151012; USARIEM-M-18/85) Avail: NTIS HC A02/MF A01 CSCL 15E

Concerned with studying the soldier, his clothing and equipment, the environment and the interactions which determine thermal stress in hot or cold environments, research studies are designed to provide a basis for predicting the soldier's physiological responses, performance decrements and tolerance times under a given combination of physical activity level, clothing and the environment. The current computerized prediction model considers the interaction of various multidisciplinary factors such as: (1) the theoretical physics of heat transfer, (2) the biophysics of clothing, (3) the physiology of metabolic heat production, distribution and elimination; and, (4) related meteorological parameters. GRA

Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

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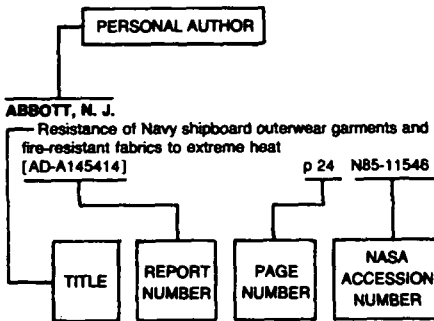
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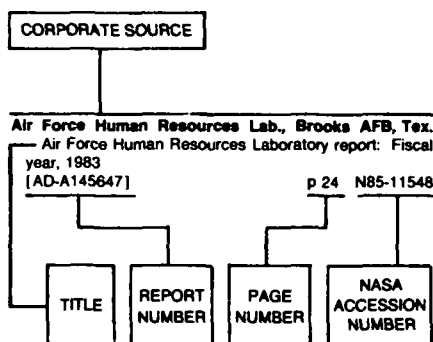
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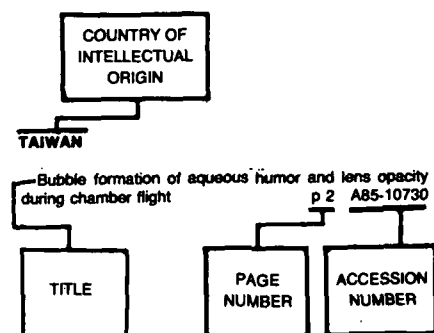
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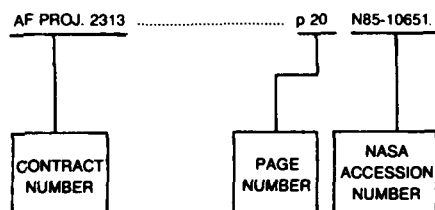
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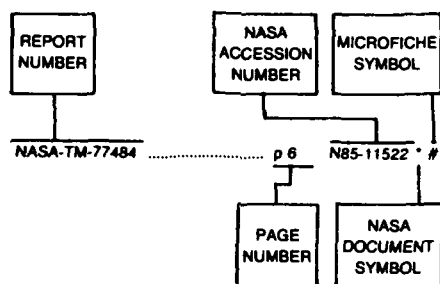
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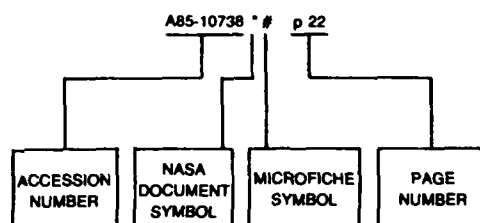
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